

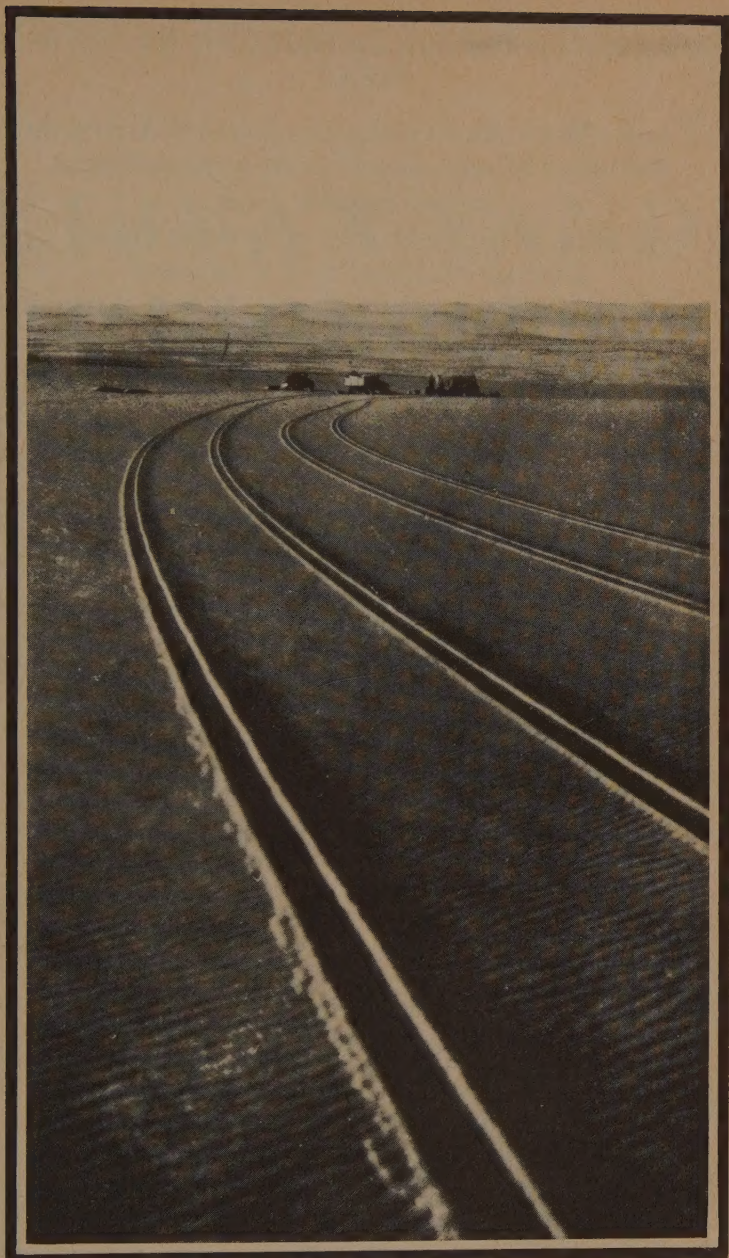
LIBYAN SANDS

Travel in a Dead World

R A Bagnold







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LIBYAN SANDS

Travel in a Dead World

RALPH A. BAGNOLD

MICHAEL HAAG

To
ALL THOSE WHO SHARED
WITH ME THE WORK AND
ENJOYMENT OF THESE
TRAVELS

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FOREWORD TO THE NEW EDITION

The story in the following pages had two separate and unforeseen sequels. Both are outlined in the Epilogue. Neither could have come about but for the experiences here related.

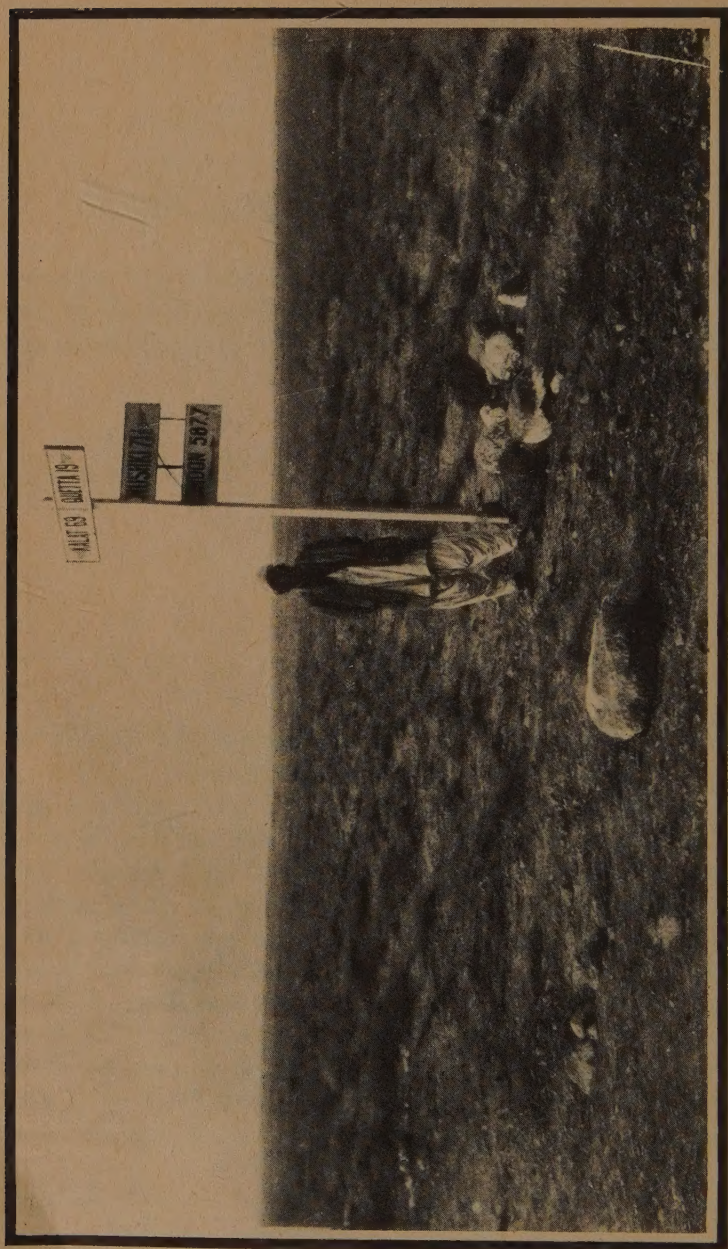
R.A.B.
London 1987

PREFACE

As other people collect their poems and finally republish them, I have collected my travels.

Travels among the ruins of desert kingdoms and the crocks and querns of prehistoric tribes; beyond them among creeping dunes, petrified forests and sand seas, beyond the last bone of man or of mouse; in places where nothing exists, no sprouting grass-blade nor worm of decay; where perhaps, in certain spots, nothing ever did exist; — travels shared, companions changing but ideas preserved; and over all a sense of what travel is, and how it can be done with little pomp, little money, much love of it and very much preparation.

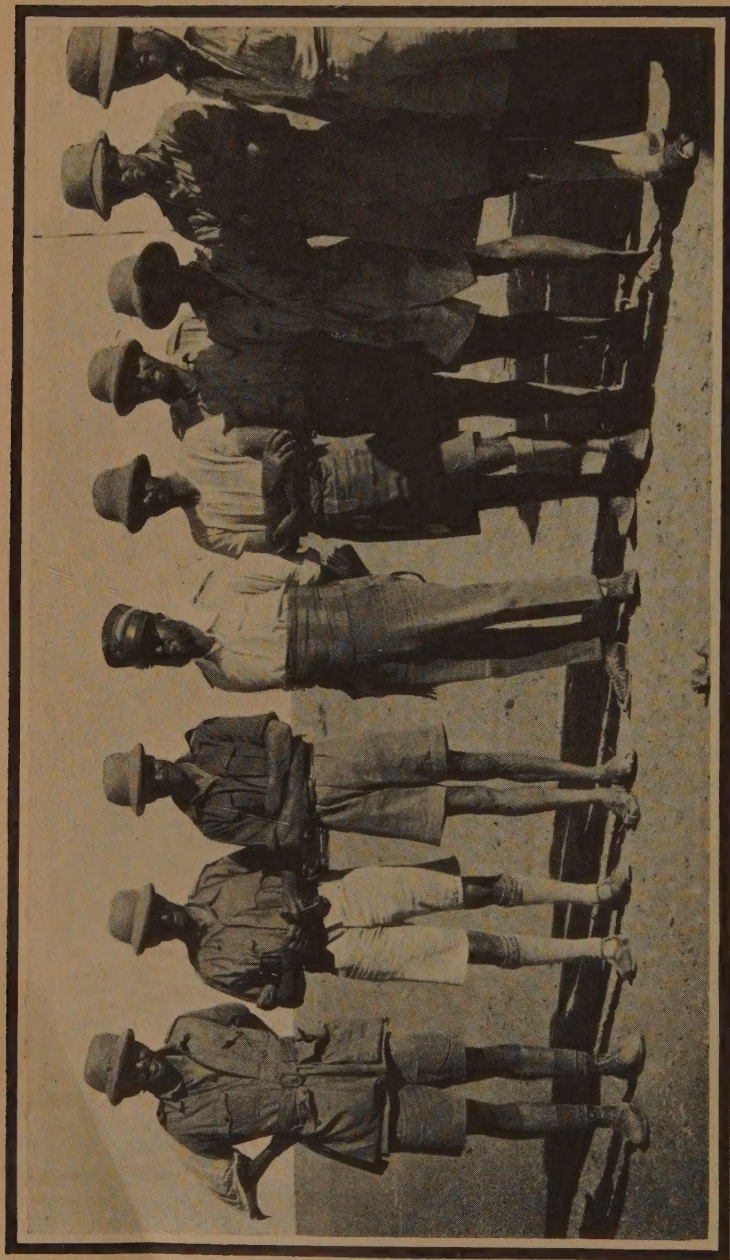
R.A.B.
Hongkong 1934



THE ROAD FROM INDIA TO PERSIA THROUGH BALUCHISTAN



A PATCH OF SOFT SAND



MEETING WITH THE ITALIAN PARTY AT SARRA WELL

Shaw, Sandford, Bagnold, Lorenzini, Craig, Paterson, Boustead, Prendergast, Harding-Newman.

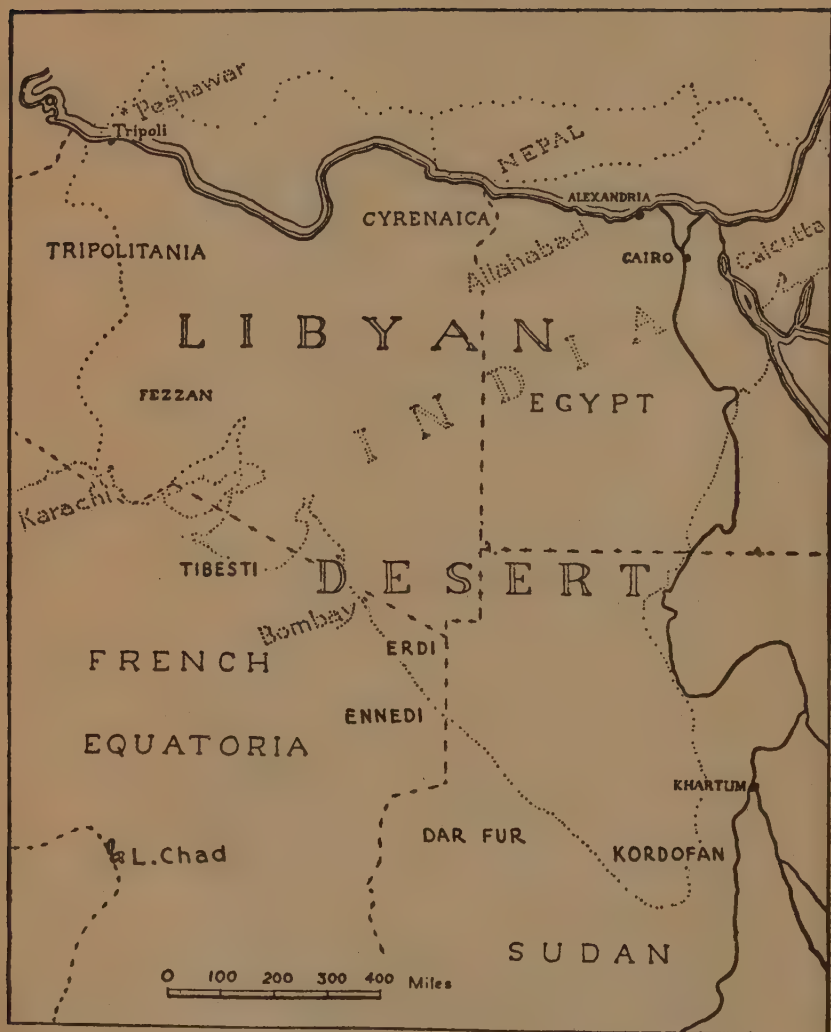
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The Maps have been drawn by the Author.



LIBYAN DESERT WITH OUTLINE OF INDIA SUPERIMPOSED

"In shape the Libyan Desert resembles the Indian Peninsula, and, a fact which may be surprising but at the same time helpful, it COMPARES WITH INDIA IN SIZE."

CHAPTER I

TRAVEL INFANTS

I FEEL that on three accounts I am at a disadvantage in the writing of this story. In the first place, the old question of truth crops up: nearly thirty others besides myself took part in our travels at various times, and were eye-witnesses of what I shall try to describe; most of them kept diaries, they all will read this book critically; some, I know, will go as far as checking dates and times. I can see one or two of the more meticulous of them throwing down the book in disgust were they to find even some innocent change of sequence, some elision of little happenings to make the account run better. How easy, in contrast, must be the literary task of the single traveller, with his unreading Arab retinue and his string of discreet camels. Not that I would for one moment hint that any of those illustrious solitaires has departed from the strict ungarnished truth by one sentence, say, of a native dialogue or by one phrase of the moon's light in the description of that indescribable thing, a desert night. But what a temptation! Then, again, on all of the twenty thousand miles of journeyings each one of my companions looked out with different eyes and remembers with particular pleasure different scenes and incidents. They will all be disappointed that their pets have been left unmentioned.

The second difficulty is that we made a serious omission. We never had a thrilling disaster. We

never lost our way, or broke down, with only a dried date to live on, till rescued by a harassed Authority after an exciting hunt with trackers and aeroplanes. We never went where we were not wanted, got shot up by angry tribesmen and provoked a reluctant Government into sending out police and troops. In short, we had no news value whatever; a most discouraging state of affairs from which to extract material for a Book of Travel, where tragedy or averted tragedy is so great an asset.

Lastly, we travelled by motor-car. People condemn the motor-car as unromantic. I am afraid this is natural, for no one can become fond of a thing he does not really understand, and the ordinary person understands a camel, if in concept only, because it is an animal like himself. But there is another prejudice against the motor-car, especially on the part of the elder men who have done all their travelling before its advent. There is here a sense of sacrilege; the old difficulties and limitations that make the memories of their journeys so pleasant to them have been cheapened, the old thrill of achievement at the crossing of an Immensity is now, they feel, almost destroyed. But to us, who know not the old way, our memories are just as cherished. We have our own difficulties to surmount and we have our thrills. Even when we increased the scale of the possible far beyond camel range the desert is still big enough to remain Immensity.

The transition from camel to car is under way; it cannot be checked. But the passing of a romantic tradition is certainly sad. We can but console ourselves with the thought that it has all happened before—that Roman travellers must have felt the same sense of sacrilege when the hideous camel was introduced to penetrate the sanctity of mysteri-

ous desert fastnesses, destroying all the romance of donkey journeys.

The history of the desert motor-car in Egypt is oddly discontinuous. Introduced into the country early in the Great War by the British Army, it was found that the Ford car, even the Model T of twenty years ago, was capable of supplanting the camel in certain areas, notably in the western desert, and in 1916 a tiny force of Light Car Patrols, armed with machine guns, guarded the whole 800-mile frontier against a possible recrudescence of the Senussi menace. These patrols covered great distances of unknown waterless and lifeless country as a normal routine, they took part in the final capture of Siwa Oasis from the Senussi, and among other things they succeeded in mapping, with the aid of speedometer readings and compass bearings a great part of the northern desert, with its ranges of sand dunes, between the Nile and Sewa. Their exploits, with the crude vehicles they had, were astonishing. The old tracks made by their unsuitable narrow tyres can be seen to this day, very faintly, far out even beyond the Oases several hundred miles from the Nile. Sometimes one can see even their troubles; deeper ruts surrounded by vague old footmarks in the soft gravelly sand, where the cars stuck and had to be pushed out by hand. All this was a new thing, quite unknown in the history of deserts, or, indeed, of machinery. They evolved a lore of their own, so that their little patrols moved confidently about without much fear of disaster.

Then came demobilisation. The Light Car Patrols were gradually disbanded, their personnel scattered to the ends of the world. Many of them appear, from the names they give to features on the map, to have been Australians. A few remaining

cars were finally transferred to the newly-formed Frontier Districts Administration, or F.D.A., who used them largely for routine work along certain well-defined tracks which had been opened up during the war.

Official interest in the desert, away from these new car tracks, ceased with the war. The F.D.A.'s job was to administer the outlying human settlements on the very minimum allowance of public money, and no longer to patrol against marauding Senussi bands. The Senussi menace was over, and with it went the spirit of the Light Car Patrols, and most of the lore they had accumulated. All that remains are a few of the names of the pioneers perpetuated on the map in the names of certain of the nearer ranges of sand dunes; even they are disappearing as the old native names are being discovered. As far as I can trace, no one has ever written up the history of the Light Car Patrols. It is a pity, for there was nothing like them before.

With the disappearance of the war-time army and the general reaction which followed the war the opening up of desert tracks ceased completely. It was not until six years later that King Fouad revived the idea. Even in 1925, when I went out to Egypt for the first time, there was still no road to Suez. The old "Overland Route" built sixty years before, with its caravanseries and watch-towers, was in ruins. A Ford could just do it if there were enough people to push, and the 80-mile journey took six hours or more. The famous Wire Road across the sands of Northern Sinai, by which the army had invaded Palestine, had disappeared. Even the method of its construction was forgotten. No one had driven a car all the way between Egypt and Palestine since the war ended, and when one car did get through in 1925 it was looked upon as a wonderful feat. So it was—of enterprise in a

country still tired of war-time over-enterprise—on the part of the salesman who did it. All this but seven or eight years after a great army with all its vehicles and lorries had made the journey.

The attitude of Cairo was the age-long attitude of the Egyptian towards the desert. The Nile Valley is Egypt and Egypt is the Nile Valley; there is nothing else. "Why," they said, "do you want to go into the desert? There is nothing there. Anyway, it is dangerous; you may get lost. Is there not ample to do in Egypt; are there not amusements enough in Cairo; do not tourists flock here every year to see the wonders of Egypt, and do they not go away satisfied?" "Suez," they said; "what do you want to go there for? There are no amusements there; no one goes. Sinai! You can't get into Sinai; the Government does not allow it; you will get arrested if you try. And there is nothing but sand, you can see it from the Port Said railway—a wretched place."

In the following pages I shall try to trace the unpremeditated steps by which a few army officers, with no initial thirst for exploration, and no desire to do anything unusual except to see the country they were in, came gradually to break away from this conventional city outlook towards things outside; and how, beginning with a sort of touring club, a technique grew up by which it became possible for ordinary mortals, without financial backing, to penetrate to places in the far interior of the Libyan Desert previously thought to be inaccessible.

There are deserts and deserts. There is the "wilderness," occupied by drought-resisting scrub and occasional grass where nomads wander with their camels; or more barren and lifeless still, but dotted with wells which provide a permanent sub-

sistence for a small settled population. By its contrast with fertile lands, its serenity, its emptiness, the idea of ageless duration it instils, it so stirs the mind of the dweller in populous rainy countries that he is moved to weave romances about it, with nomad raids and "sheiks." But there is nothing terrible about the wilderness. This kind of country occupies much of the world; it exists in every continent. Of such a type is all the country east of the Nile in Egypt; it stretches away across Sinai, across Arabia to Persia and beyond.

Very different is the great lifeless desert that rolls like a sheet of blank paper westward across North Africa from the western banks of the Nile.

The first chapters of this book concern the early sight-seeing trips we took into the wilderness of Sinai and Transjordan. I start with them, not because I am competent to describe the country—Major Jarvis, in *Yesterday and To-day in Sinai*, has already done that—but because by using cars for the first time we were in those days in a sense pioneers, and it was on those trips that we came to realise what cars could do. But on all those early trips we were tourists only, seeing things from a rather more interesting angle it is true, finding our way instead of being led, but still seeing things superficially as tourists do.

The original chain of events which set us going was somewhat devious.

The officers of the Royal Engineers, Signals and Tanks belonging to the British garrison at Abbassia on the outskirts of Cairo lived together in a collection of wooden huts, sharing a common Mess. None of us had served in Egypt during the Great War, and the general outlook of the Mess was much as I have indicated. The Royal Tank Corps, however, was represented in Egypt by the 3rd Armoured

Car Company which inherited from the Duke of Westminster's unit of Siwa fame, and several of their officers had joined them very shortly after the war was over. One of these was Lieut. A. J. Bather.

Bather had lived for a year or so with a last relic of the war, an isolated section of armoured cars stationed at Sollum, 400 miles westward along the Mediterranean coast, on the frontier between Egypt and Italian territory. This little town had been a base for the war-time operations of armoured cars and Light Car Patrols against the northern wing of the Senussi invasion. It was also the starting-point of the old caravan routes leading inland to Siwa and Jaghbub Oases, Kufra and the still mysterious Senussi-land in the unknown interior.

Alone of all the officers in Egypt Bather caught the attraction of the desert, and brought it with him to Cairo when he was recalled in 1924. Perhaps it was the result of a strange incident in which he had assisted Sayed Idris el Senussi himself when the latter was in trouble; perhaps it was the presence of Hassanein Bey in Sollum while that explorer was completing the preparations for his great journey southwards to the Sudan, or simply that the spirit of the Light Car Patrols lingered on in the outpost of Sollum after it had died of lack of funds and of official support elsewhere. It was Bather who first started the idea in our conventional post-war Mess that there was fun to be got out of a holiday in the desert, if one set about it in the right way.

Not that the idea caught on. There were difficulties. The first essential was to have two Ford cars. Cairo was an expensive place, and the few cars that the Mess owned were cheap but highly respectable English ones, very suitable for journey-

ing into Cairo, and fit to be found alongside one's colonel's car at Gezira Club; but they refused positively to submit to the indignity of leaving the roads and being bumped about over gravel and sand.

Now the first law of the Light Car Patrols was that if a party went anywhere off the beaten track farther than walking distance from help, the risk of disaster must be reduced to a second-order chance; for a party out in the desert is not entitled to any outside help, and cannot expect to be searched for by a relief expedition with water and food. No single accident, therefore, however serious, must be allowed to leave the party stranded. Only a sequence of such accidents, one on the top of the other, is excusable. Hence, among other precautions, one must never go far off the beaten track with less than two vehicles in case one of them breaks down. For long journeys there must be more than two.

That year Lieut. V. C. Holland, Royal Signals, was persuaded to buy a second Ford, and at Christmas 1924 he and Bather set out for a week's cruise in the neighbourhood of Patridge's Dunes on the edge of the western desert. During that week Holland got thoroughly bitten with the whole idea of the thing; with the sense of freedom to go just where one liked, driving on a compass course; with the awe of a new and utterly lifeless world; with the thrill of forcing a car at obstacles that no car was designed to encounter; with the clean coolness of sand dunes in the evening, and the dry sparkling desert air. They did the thing properly; they were away from water and so they stuck to the rules that Bather had learnt; there was a daily water ration for drinking only, there was no washing, and they went unshaved. They thoroughly enjoyed themselves.

Then the heat of the Cairo summer came on and no more was done. Bather never pursued the idea. He had many other interests and many friends in Egypt. He went to England the following winter.

I arrived in Egypt in October 1925. I felt a hearty relief at escaping from the humdrum existence of a recruit depot in England. After all, it was a little difficult to settle down to mere routine after the war years spent in France, followed by a postponed but joyously-regained youthful freedom at Cambridge with vacations varied by unconventional trips in post-war Europe by boat and on foot—followed again by the abnormal atmosphere of Ireland during the last phase of “The Trouble” and the subsequent civil-war period.

It was the first time I had ever been East. At first sight it was a little like Ireland over again. The Sirdar had been murdered not long before, so we were not allowed about unless armed with an automatic pistol—just like Ireland. But otherwise it was all new and interesting, with a vague glamour added by my father’s stories of the 1884 campaign for the relief of Gordon and of early archæological work with Wallis Budge—exploring the interiors of pyramids and raising colossal statues from the beds of lakes.

Holland and I soon discovered a similarity of tastes. Ancient Egypt had caught Holland badly, and his enthusiasm to see all there was to be seen soon influenced me also. Not that we attempted to take up the subject more seriously than by reading the few up-to-date books available. Officialdom and the jealousy of the experts both conspire to discourage the layman from Egyptology, the former by surrounding all the more spectacular remains by a horde of ignorant parrot “guides,” the latter by removing everything portable, and

omitting to leave behind for the normally interested person any readable description of what was found or in many cases to publish any account or reconstruction of the place and period. No. We merely felt, consciously and unashamedly, the exciting mental kick of an apparent breakdown in the flow of Time, whereby one sees and touches the buildings and belongings, perfect as of to-day but oddly different, of a people inconceivably old. I remember vividly my feelings on one privileged occasion at Dr. Reisner's camp when I was allowed to handle a golden basin he had just found in the tomb of Cheop's mother, which was new before the Pyramids were built, and in which the infant Pharaoh might have once been scrubbed.

But there was more than that. There was, in visiting the less accessible remains, away from guides and tourists, an excuse to get out into the desert, be it only for a mile or so, an excuse to imagine that in those unfrequented, unsurveyed expanses of sand and rock there might be something still to be discovered just a little farther out, and an excuse also to indulge in the newly-found excitement of driving a car where it was said cars could not go.

But the little English car I had brought out with me which had carried me so reliably on English roads was quite useless off the beaten track, as Holland took care to prove. In a few weeks he had his way; I bought a Ford.

Now, with two cars and a few passengers to push us out of sand drifts, we began to make rather longer excursions, out of sight of the cultivation. We bumped our way south-west from Mena Pyramids, out into the hazy nothingness of the western desert, making almost the first car tracks of what afterwards became King Fouad's road to the Faiyum. There were ruins to be seen in process of excava-

tion by a party of American archæologists on the edge of the Faiyum depression. You descended gradually for many miles down and down, below sea-level, over a succession of sandy beaches bare of all life as far as one could see, left by a shrinking lake of prehistoric times. Then in the distance the queer irrigated hollow of the Faiyum spread out like an oasis. We liked the Faiyum, with its walled gardens and villages that looked and smelt so different from anything in the Nile Valley; we liked the queer sleepy music of its ancient wooden water-wheels eternally lifting water from the canal.

We visited every pyramid of that long row which stretches for 70 miles along the Nile, climbing to their summits and creeping down the dark tomb shafts among the bats and owls. We drove northwest from the same desert gate of Mena, along the track the armoured cars had marked out, to see the old Coptic monasteries at the oasis of Wadi Natrun, and the pink lakes of soda crystals.

We made expeditions to Suez along the wreckage of the Overland Route which, built in the 1860's before the Suez Canal was dug, and disused for many years, was now washed away by floods of rain and drifted up with sand. On the way we would explore the queer ruined palace a mad khedive had built for himself forty miles from anywhere without a water supply; or stop to peer down the great empty shaft whose history no one knows, to look at the little Bedouin shrine with its offerings of bits of rag and bottle necks whose glass had turned purple in the sun, at the Roman cistern and the ruins of railway stations on the still-born Cairo-Suez railway which the digging of the Canal had also killed.

At other times we just played with the cars; we took them far into the Mokattam Hills, we

found ways up stony cliffs, got stuck in powdery clays, dug the cars out and tried again, learned to drive fast across boulder-strewn country, threading our wheels in and out between the larger rocks. It was a new game. With proper handling it seemed the cars could be got anywhere, over any country except soft sand. There were endless possibilities, now that roads were not a necessity, and inevitably we began to look farther afield.

On the wall of our office, behind my commanding officer's chair, there hung a map, very old and faded, like all things that hang on the walls of offices, a map that had probably hung there since the war period when the Army in Egypt had a wider outlook than in 1925. My eye used to wander from Cairo to Suez, eastwards across the Canal, across Sinai, up to Jerusalem, to the Great Rift Valley of the Jordan, the Dead Sea and the Gulf of Aqaba. Tucked away in the mountains of Transjordan south of the Dead Sea, I discovered the words "Petra (ruins of)." It was not so very far away. Why shouldn't we go and see all that? Was it really true that Sinai couldn't be crossed, that it was very dangerous and that the Governor was an ogre who refused to let anyone go and see his country? One might get ten days' leave. One could go a long way in ten days. But the people to whom I mentioned the idea were not encouraging. One could never get permission, they thought. No one had done such a thing before, so presumably it couldn't be done. I broached the subject at British Military Headquarters. They didn't think they could allow it. There was Risk. They must consider carefully. Anyhow, they would go as far as consulting the Frontier Districts Administration and let them decide. It was clear we must get a word in first with the Frontier people,

so down we went to the Egyptian Ministry of War to see Chetwynd Bey, whose acquaintance Holland, through Bather, had already made.

The Administration then contained seven British officials, the O.C. Camel Corps and his assistant, and the Legal Adviser at Headquarters in Cairo, the Governors of Sinai and the Western Desert Province and their assistants. Major Jarvis, the Governor of Sinai, happened to be on a visit to Cairo when we arrived, and was in the office.

A Sudanese orderly in the smart uniform of the Egyptian Camel Corps brought coffee. We broached our idea. Chetwynd's point of view as O.C. Camel Corps was clear. He wanted to be certain that we should not get lost or break down and give his Corps the needless bother and expense of sending out to collect us. There had been trouble in the past; people did such silly things. We had suitable cars? Good. We would take a sufficient party to push them out when stuck? We would be sure and take enough petrol, because we should not find any till we got well into Palestine. We were expert mechanics? We would have compasses and all that? Then he hadn't any objections at all.

Jarvis' outlook was different. A keen enthusiast about his Province, he warmed instantly to anyone who showed signs of taking an interest in it, provided they were not going to be a nuisance. But the trouble was with his roads. He had to run a country half the size of England on a revenue of a few thousand pounds. They had just scraped together enough money to buy some wire netting with which to pave the worst stretches of sand-drift between Suez and the hills, so that their light Fords could get through without having literally to be carried as they had had to be in the past, and they were a little annoyed when recently a big Studebaker had pushed through over the wire on its way to Pales-

tine. If we damaged his wire road still more Jarvis would be angry with us. However, he gave us the necessary permits so that we could cross the Canal; beyond, he said, the sand of the Mitla Pass was still very difficult even with the wire, but we could try



SINAI AND SURROUNDING COUNTRIES

it; and we could use his little police posts in Sinai at nights. About Transjordan they could tell us little, and we gathered that this year a visit to Petra would be impossible, as the Wadi Musa tribes near by were giving trouble. Police posts had been burnt and the police had been temporarily withdrawn.

So far so good; we had two cars and we had permission. Now we wanted a party. That was always our difficulty. Only a limited number of people can be got away from their work at any one time, and many of these have not the slightest inclination to use up any portion of their precious annual leave-allotment in experimental pleasures that have never previously attracted them. In the end we got three others. Kennett and Hansard as passengers in our cars, and Boothby with a big Harley-Davidson motor-cycle.¹

No small part of the joy of any trip lies in its planning and preparation. In our case there was a great deal to be done. In the first place, though there were old maps of Sinai and southern Palestine, they did not mark the route by which the first car had gone a few months before, and neither of its two occupants was available to ask. The F.D.A. officers and others still thought rather in terms of camels than of cars. Looking back, it is almost unbelievable how little was then known about the Sinai Road.

Then there was the interest of making lists—of wandering round food stores buying supplies for a week. In Cairo a special fascination surrounds tinned foods; English, French and Italian products vie with one another in the glory of their labels, arousing a thrilled expectancy as to what is inside them. Spare parts for the cars must be selected in case of breakdown, petrol and tyres thought of, for nothing could be got on the way without assistance from the F.D.A. That we were determined not to seek. I think that even before this first trip we had formulated the principle, to which we afterwards adhered, that sufficient supplies must be taken to

¹ Lieut. R. L. Hansard, Royal Signals; Lieut. J. C. Boothby, Royal Tank Corps; Lieut. B. B. Kennett, Royal Signals.

enable the party to get back the same way if forced by chance to turn back within a short distance of the objective. It was quite possible, for instance, that drift-sand or floods might prevent our getting to Beersheba, the first place where petrol could be got, so that we must be prepared to make our way back with our own supplies to Suez. The cars actually carried 28 gallons of petrol each, a great load in those days when added to all the other things, food, spare parts and kit.

We left Suez early one morning in March 1926. We would cross the Canal at Kubri Ferry and be away into Sinai that day, possibly as far as Nekhl, which was less than 90 miles. The Frontier people had given us instructions about the route, such as it was. "You run six miles up to Kubri, cross the Canal and keep straight on along a track you'll find marked out with cairns, which joins the old African Pilgrimage route to Mecca, the Darb el Haj. You follow that through the Mitla Pass and out into the main plain of Nekhl. You may get through the sand. If it happens to rain out in the plain beyond you will have to wait for three days till the mud dries!"

The first two days were full of troubles. To begin with, we could not find the ferry, imagining in our innocence that there would be a road to it. Then there was a bother about our permit to enter Sinai; the native Sinai policeman said it was invalid because it had not got the car numbers written on it. Most of the first day was spent in overcoming these difficulties and in finding the track on the other side, in a wilderness of salt swamp and the rusty barbed wire of war-time defences.

Darkness came on before we spotted at last the lane of tiny stone cairns by which the F.D.A. had marked the new track into Sinai. Disconsolate, we

halted for the night, camping in the pool of light made by the headlamps of the cars.

Nekhl was as far away as ever. We had driven over fifty exhausting miles, advancing but seven in the right direction. Fifteen miles of blown sand still lay between us and those Mitla Hills. We had not even got far enough away from civilisation to be safe from casual thieves, and had reluctantly to keep a watch in turn throughout the night.

It was a dark night, threatening rain. Standing on a little hillock of gravel near some ruined trenches, one could just see the lights of Suez in the distance, and, near by, the sleeping forms of the others, wrapped in blankets and valise, scattered around in sheltered sandy hollows. From time to time the search-light of an approaching liner far up the Canal would make a strange false dawn, growing brighter, lighting up the long outline of the Canal bank two miles from us. Then the ship itself would glide by, a lighted town moving through the desert with a faint slow engine-throb just audible in the stillness. We woke to find everything soaked with dew.

Soon, as we followed the line of cairns, the hard permanent gravelly desert, burnt grey with years of the sun's action, became dotted with little drifts of yellow blown sand. Every stone and desert thorn had its own yellow shadow which got bigger and bigger as we went on, till long bars of sand stretched across the way, burying the mark-stones.

It got very hot. The ground rose steadily mile after mile, and our engines boiled. The sand was now everywhere, in yellow undulating cushions with only a few streaks of grey ground left exposed. The sand all looked the same; but sometimes it was hard like the floor below while at others one could see where the tracks of previous cars had ploughed in deep. The only way to take that sort was to fly at it with open throttle, gripping the steering wheel

with all one's might. The car seemed bewitched, squirming and wriggling sideways quite out of control. Often a car would arrive at the far side of one of these drifts broadside on; often we could not hold the steering wheel at all, and the front wheels would lock round, pulling the car up dead in a cloud of sand.

By noon we got to the foot of the hills, against which sand was piled up in steep drifts. Much of the F.D.A.'s netting, by which alone the ascent was possible, had been buried by fresh sand deposits driven over it by a recent wind. But at last we breasted a rocky knoll, saw the last of Suez and the hills of Egypt, and dropped down into the sandy bed of a wadi walled in by bare crumbling hills. Here we stuck firmly. Altogether it looked as if we should never get to Nekhl. The heat was very trying; steam was pouring from the car radiators. For several miles we had been pushing each of the cars in turn, laboriously, a few yards at a time. *

So this was why it was said to be difficult to get into Sinai. It was not the obstruction of the authorities, but the obstruction of the sand, against which the motor-car was helpless. We had taken four hours to do ten miles; a baggage camel could have done it in less time. We were convinced, as others had been, and for years nothing altered our conviction, that whatever else a car could do, it could never tackle this kind of country, covered with deep blown sand.

We lunched sitting in one foot of shade underneath a wall of sand that trickled down our necks, and eventually, with the help of some bedouin, managed to get the cars out of the wadi bed and on to a track strewn with boulders.

All that afternoon we bumped and wriggled up a valley, over rocks, in and out of steep-sided water-courses, rising gently for twenty-five miles till at last

the head of the Mitla Pass was reached, and we looked out eastwards over the central plateau of Sinai. I never dreamed that cars could twist and bend to such an extent. Sometimes it seemed as if the front and back axles were at right angles to one another.

After that the rest of the trip was astonishingly easy considering the gloomy prophecies made by our friends in Cairo. The tracks of previous F.D.A. cars took us to Nekhl, the old capital of Sinai before the coastal railway killed all the caravan traffic which used to pass this way; and thence north to Bir Hassana. Here we joined the rather weathered but still sound military road which the Turks had built from Palestine for the invasion of Egypt in the early part of the war, and which is becoming now the motor artery between Africa and Asia. It was derelict then; bridges had been washed away, but the surface for quite long stretches was still very good. It was strange to drive for a whole day along a smooth metalled road with never a vehicle or man upon it, to meet here and there a large bush growing in the middle, or a sand dune, which had crept across it since the still-visible wheelmarks of the old traffic had ceased.

Of the Palestine administration there was no sign, no frontier post, police or customs.

At Jerusalem we stayed at a Jewish hostel, for the two hotels were full of devout Easter tourists. Jerusalem was then a noisy dirty place with bad shops and unpleasant people. The prices were high, water was scarce, and the streets were full of big touring cars whose drivers declared the importance of their clients by the loudness of their electric horns. But the view from the Mount of Olives over the Dead Sea and the Jordan Valley far below, across to the 5000-foot wall of the

mountains of Moab, all deep red in the setting sun, was worth everything else put together.

A twisting dusty road full of hairpin bends descends to the shore of the Dead Sea. In the sticky heat Palestinians were bathing from establishments on a sort of Brighton Beach. Then across the Allenby Bridge into Transjordan the road rose again up and up, following a fresh mountain stream along a winding valley full of oleanders and wild flowers, to the eastern highlands 5000 feet above.

Transjordan in the early spring is a beautiful country of streams and little fertile valleys with crops and orchards and vines. The hill slopes are carpeted with wild field flowers, making a continuous blaze of colour. On the high undulating downs towards Amman we stopped to mend a puncture opposite a dew pond where cows were coming to water in the evening. It might well have been the edge of Dartmoor grey rocks sticking out from the grass, and water about, and cows.

At Amman, things were very different from Palestine. A little inn had just been opened. Everyone seemed pleased to see us. The innkeeper did everything possible to make us comfortable. The Arab Legion men doing police duty in the town were friendly and ready to help. The place was full of new buildings and newly-found security. Greyish-brown houses were spreading up the sides of the shallow little valley, between limestone hills all covered with scented wild-flowers. A happy country.

But little time was left. After a day spent in a visit to the ruins of Jerash, and an evening call on Peake Pasha, the Commandant of the Arab Legion, we had to return to Cairo. The whole trip of over a thousand miles had taken but ten days, and cost four or five pounds a head, less than a fifth of what one would normally have to pay.

CHAPTER II

PETRA

AMONG the many things we had learnt from this first trip and noted for the future was the need for an extra hand to push. Six was clearly the party for a journey with cars over doubtful tracks where difficulties might be met with. This meant that three cars were wanted, for it was evident that motor-cycles were of little use, being unsuited for rocky country, tiring, and unable to carry their own share of supplies. Someone else, therefore, must be induced to buy another Ford. We wanted someone of a mechanical turn of mind capable of looking after his own car, for each driver should be his own vet to diagnose and cure any car ailment as soon as it developed. He must also be open to persuasion, not too whole-heartedly concerned with the Cairo season, not averse to hard physical work in the hot sun or to dispensing with civilisation's comforts for a while. And we wanted someone who would fall in love with the desert atmosphere and with the wild rocky scenery just as Holland and I had done.

An expedition had been organised by various people in our Mess to explore with ropes and search-lights the great quarry labyrinths underneath the Mokattam Hills near Helouan, whence the old builders cut out the limestone blocks for the Pyramids across the Nile. There was quite an enthusiasm just then, started I think by Holland, for seeing the lesser-known antiquities, the really

interesting bits of ancient Egypt to which no tourist is ever taken because they are a little awkward to get at, or are not in the curriculum.

Lieut. E. Bader of the Sappers was singled out as the most likely recruit. I took him in my Ford to the quarries, purposely choosing a tortuous route in and out of old diggings, between boulders, up and down steep wadi banks. The car played up; it pulled manfully; it climbed short but incredible slopes, descending sideways at strange angles, lifting one wheel after the other over rocks, daintily like a hill pony. Bader was delighted, enthusiastic. He coveted a Ford, inquiring the cost and examining its queer design with a technical eye. I had almost succeeded. Nothing remained but to get him to sell his present car to raise the money. But here there was delay. He owned a three-wheeled affair to which he was much attached and with which he would not part. Finally, Providence intervened. He collided one dark night with a level-crossing gate on which the State railways had forgotten to hang a lamp. His car was wrecked, and he emerged from hospital badly shaken—but he was ours. He bought Thérèse, a beautiful two-seater Ford, brand new from the agent's shop window.

Bader was an acquisition; he brought a new influence to bear. He shared with me an absurd desire to reach the tops of hills, to clamber over rocks, bare-footed for preference because it reminded him of South Africa when he was small. Together for a bet we scrambled up the smooth overhanging covering of Chephren's Pyramid in the dark; we explored the Mokattam Hills looking for good cliffs to climb. We set out to test how little water one could really do with, and walked twenty miles across the Mokattams on a blazing summer's day with one water-bottle between us, most of which we had to pour into a hat to give to my Alsatian, who insisted

on following us till he sat down and cried dismally for water.

Over-confident, we set out to Suez in Thérèse one cool week-end, to climb to the top of Gebel Ataqa. Owing to boulders we were forced to leave the car three miles away and walk thence to the foot of the 3000-foot cliff which overlooks Suez. With nothing but one bottle of beer we had bought at the hotel, we began to climb. The expected north wind failed; instead, a stifling Khamsin air drifted up from the Red Sea, drying the skin and making the steep crumbling screes and sharp knife-edges of limestone untouchably hot. At midday, after a four hours' climb, we reached the plateau top, rested without shade, and foolishly drank our hot gassy beer. Nothing can taste more beastly than hot beer when one is really thirsty. It gives no relief and only makes thirst more keenly felt. We went for two miles along the crest looking for a better way down, but the cliffs were sheer without a break. The dry heat and the rocks had already loosened the stitching of our shoes. First mine then Bader's came to pieces and we had to tie the soles on for as long as possible with handkerchiefs and bits of shirt-end. The descent took another four hours, chiefly owing to the trouble with our feet. The sun had set behind Gebel Ataqa before we reached the car, stumbling over rocks, dry-mouthed, sore-lipped, beginning to admit that perhaps after all the Southerner is right,—only mad dogs and Englishmen walk in the sun. Neither of us will forget that day. We drank as much as we dared of the radiator water with its oil and rust, and three gallons more of liquid between us when we got back to Suez.

On another occasion, this time with Colonel S. F. Newcombe, and at his instigation, we tried to find a direct car route from Ismailia to Cairo, avoiding

the cultivation. We started well. It was like the official progress of a Pasha. Each village turned out to discuss its little needs—a new bridge here, a road there, intercession with the Government about some grievance—interminable coffee. There were obstacles to cross before we got clear—the steep banks of a canal without any roadway up them. But the Colonel merely waved his arm and forty men ran half a mile to help, picked up the two cars bodily and carried them to the top. Yet they all knew he held no official position with them, that he was entirely unconnected with the Government. It was merely that he was Newcombe, a legendary figure from the war who could persuade a native to do anything, who could quell a brawl with a laugh and two words of Arabic.

All this took time, and it was noon before we had got the cars through a belt of low dunes on to good stony ground. It had been agreed that the Colonel should provide the food, but the day went on and neither Bader nor I liked to suggest a halt for lunch. At last he produced the complete supply of food he had brought—three small ration biscuits.

The guide we had picked up to take us to the Darb el Haj lost his way in the dark—we were very late—and landed us in a field of dunes from which we spent till midnight extracting ourselves. Fortunately the big wireless masts of Abu Zabel standing out in the moonlight showed us where we were. Seeing a light burning in the house of the superintendent of the wireless station, Commander Grattan, we groped our way to it through barbed wire and over ditches and sand drifts. Bader and I were both sick with hunger; our mouths watered when Grattan offered us a meal, but the Colonel, as usual blissfully unconscious of hunger or any other bodily feeling, of everything except the job on hand, refused, saying that we had just fed.

At 2 a.m., before reaching Cairo, we pulled up at a level-crossing gate where a train lay lifeless across the road. "This," said the Colonel, "is where we sleep for a quarter of an hour." He was asleep instantly, snoring. Fifteen minutes later he woke up with a start, leapt from the car, found some train-hand lurking in the shadows, and in less than a minute had collected a gang of men, split the train in half, and got the gates open.

In the autumn of 1926 the project was revived of reaching Petra, the idea being to cross Sinai not by the Turkish road as before, but due east to the head of the Gulf of Aqaba, thence up through the mountains of Transjordan to Maan.

By a chance meeting in a train, Holland had been able to get Peake Pasha's personal blessing, and a promise that the necessary orders would be given about us in Transjordan. Some work, he said, had been done between Maan and Aqaba in the bed of the Wadi Ithm and on the high pass of Shtar, and a car had recently been down to Aqaba that way; but no one had been right through by car from Sinai or Egypt.

The Egyptian F.D.A. were very kind. Sinai was open to us to go where we liked. From them it was learnt that the only real difficulty lay in the sudden 2000-foot drop from the Sinai plateau to the Gulf of Aqaba. Only one car, in charge of an Egyptian officer, had ever slid down the pass, and that had had to return another way. They did not think it was possible to get cars up the pass, so once down we should have to return through northern Transjordan and back by Amman and Jerusalem, thus making a complete tour of the Dead Sea.

On the experience of last spring's trip there was much to be arranged. The Mitla Pass into Sinai, with its sand drifts, must again be overcome, and

something must be done to make easier the crossing of the steep-sided watercourses in the Mitla Hills. For the sand we adopted the only expedient then known, rolls of rabbit-wire about twenty yards long to be laid in front of each wheel track over bad drifts as they were encountered.

It was thought that the best answer to the difficulty of the vertical water banks would be to carry light portable ramps to be laid like bridges for the wheels, so as to avoid the necessity of digging down the banks to make a road. After unsuccessful experiments with corrugated iron beaten into channels, Bader discovered, by nosing round among the old-iron shops of Cairo, a stock of strong rolled-steel troughing designed in the war for roofing dug-outs. We bought a couple of these, five feet long, to carry with us. Actually the road was found to be so much improved that the channels were not wanted once. They were carried home and lay about at the back of the Mess garage for the next three years till accidentally, as shall be told, they paved the way very literally for our later expeditions.

Packing had been a tiresome business. The cars had ordinary touring bodies, and there was little room behind in the back seats for all our gear. We now placed all the two-gallon petrol tins containing our petrol and water in a row outside along each running board, kept in position by a wood batten passing through all the handles and bolted securely to the running board. Then again there was some doubt as to how best to carry water. Petrol tins were certainly the most convenient things, but the water went black and sour in them. That was solved by replacing the leather washers in the stoppers, which were the cause of the trouble, by rubber ones cut from the old inner tubes of tyres.

How easy is a journey done a second time. We¹ arrived at Suez on the evening of Christmas Day 1926 ready to cross the Canal at dawn next morning. To avoid the delay at the ferry, Bader and Maunsell went on that evening to arrange matters with our friend M. Vangelli Stephanos of the Suez Canal Company at Ferry Post, and with the over-suspicious policeman who had delayed us for four hours last March. The result was good; we were across almost before dawn, even the policeman helping to haul on the winch to grind us across with the three cars.

The wire netting saved a great deal of pushing and digging in the sand beyond, though it was by no means an ideal method of progress, and was very slow. Each time a car got stuck, the two lengths of wire were unlashd from the top of the car that happened to be carrying them, unrolled and laid out side by side in front of the front wheels. With everyone pushing behind, the car was moved bit by bit with the back wheels spinning in the sand, till at last it was far enough forward for the back wheels to catch on the rear edge of the wire. There was then something for them to pull against, for the wire was held firmly down by the weight of the front wheels; and if the front wheels had not by that time skidded sideways off the wire, the car would usually take charge and run along the wire, gathering speed as it went. That was what was supposed to happen. Often, in practice, though, since the wire was springy and as it had to be carried tightly rolled up on the cars, it would jump up after it was laid out, just at the critical moment when a car was about to reach

¹ The party consisted of Lieut. V. C. Holland, Royal Signals; Lieut. E. Bader, Royal Engineers; Captain V. F. Craig, M.C., Royal Engineers; Lieut. R. G. L. Giblin, Royal Signals; Lieut. R. J. Maunsell, Royal Tank Corps, and myself.

it, and roll itself up again. After a car had been over it, and when we wanted to roll it up, it was of course much distorted and very difficult to roll.

Although the Mitla sand still took three hours to get through we managed to reach Nekhl by midday, doing in a morning what had taken more than two days on the first journey. The route was certainly easier through the hills, for there had been no rain and the F.D.A. cars had by now worn a moderate track; but it is the sure knowledge that the way is really possible which speeds things up. One does not hesitate, stopping doubtfully whenever the track is lost, but forges ahead knowing that it must appear again farther on.

Encouraged, we pushed on another forty miles to Themed for the night, still over the same Sinai plateau of barren limestone. The sun's rays, reflected off the hot air near the ground, formed white shining lakes. Blocks of hills, rising out of the plateau in flat layers, appeared and disappeared on false horizons of smoking mirage.

It was quite dark by the time we got to Themed, a couple of tiny two-roomed stone huts tucked away under a low cliff. Two F.D.A. policemen greeted us as if, as was quite likely, they had seen no one for several months. Candles were produced, and firewood, the night being cold. Soon a fire of acacia wood, tamarisk and dry desert scrub was blazing in a corner, filling the room with a pleasing incense-laden smoke. We were very tired after twelve hours' driving over continuous obstacles, but well content, for a far better start had been made than we had hoped. We spread ourselves over the evening meal, with fried sausages, bully stew and onions, and tea improved by rum.

There was a glorious stillness after the vibration and rattle of the day. The silence was absolute. We were two hundred miles from Cairo, and there

was nothing near by to make a sound. Outside in the open one listened expectantly for some small noise, a cricket chirping or a cock's crow, but nothing came; only a little gust of cold dry air that eddied softly in the hollows of one's ears. It seemed odd almost that the stars overhead, twinkling with a frosty vigour, could do so without making some sound about it.

The old Haj track, long disused, ran straight on to the east, towards the cliffs where the descent to Aqaba began. But times have changed. Now the only tracks are those of military patrols radiating from the frontier post of Kuntilla where a small garrison is kept, south-east along the heights of the eastern frontier towards Aqaba.

From Kuntilla, the frontier track, rising steadily, led across a tilted plain of brown shingle which roared under the speeding car wheels. Through occasional gaps in a low range of hills the mountains of Transjordan twenty miles away were now visible in the east as a long frowning purple cliff.

The chasm of the Rift Valley between the distant mountains and ourselves gave a warning of its presence by a peculiar luminous haze. It was as if a belt of yellow light shone upwards from the depths in front, rather as things appear looking from roof-tops across an unseen lighted street at night.

The ground changed suddenly from brown flint to a blood red, and over a last ridge of volcanic rock we looked down 2000 feet: on to the shimmering yellow sands of the bottom of the Wadi Arabah to the north, the sea beach at our feet and the bright blue water of the Gulf of Aqaba to the south, all enclosed in the one trough of the Rift.

Ages ago the whole of the land surface cracked in half north and south for several thousand miles. Here, as with a deep wound, the flat white skin of

limestone was thrust upwards and back, at the edges of the open cut, by green and red volcanic matter welling from underneath on both sides like long festers, walling the central trench.

The ground below us fell away sharply in a confused mass of rock eroded into knife-edges between twisting gorges and chasms filled with impenetrable black shadow; an inferno whence one expected smoky forms to rise. Far down at the bottom on the farther side a fringe of green palms curled round the water's edge separating the sands of the Wadi Arabah from the sea. By a trick of the light the depth looked enormous. Opposite, stretching to the right and left as far as the eye could see in the purple haze, towards the Dead Sea on the one side and towards Medina on the other, rose the 6000-foot mountains of Transjordan and the Hedjaz, lapped over as the folds of a huge red curtain.

There had been no road since leaving Suez—only the usual wheel tracks running over the dry open plateau. It seemed impossible that we could ever find a way down, but there appeared suddenly the beginning of a made road, cut through the rock by human hands, absurdly steep, to be sure, and lacking any surface but the rough-hewn rock which dropped in jagged steps a foot in height, or here and there a slope of loose large stones casually thrown together inside a built-up wall. Yet it was a road, surveyed with some skill; an odd piece of road all by itself, built, we afterwards discovered, on the alignment of an earlier road, by the Khedive Muhammad Ali and his son Ibrahim a hundred years ago, to get their guns and transport down to Arabia to the conquest of the Wahabis, who, under an earlier Ibn Saud, had occupied the Holy Places of the Hedjaz. Since then it has been unused, untended and forgotten. We crawled down it very cautiously, the whole party checking the cars by hand one by one

as they skidded with ominous rumblings of loose stones on outward-sloping hairpin bends. Often the gradient was 1 in 3 with a precipice outside. Down and down the road wound, always just passable; nowhere had it quite fallen away or become blocked by landslides. But the conqueror had never meant his transport to return, and it was clear that with our overloaded cars we could never get back that way. It was a one-way road, with gravity as a very resolute policeman.

At the bottom, separating Egyptian territory from Transjordan, the Wadi Arabah was a no-man's-land across which no legitimate traffic went. To reach Aqaba, several miles away round the head of the Gulf, we had the alternative of the actual beach of loose deep shingle, or, farther inland, the soft clays, salt marsh and drift sand of the Arabah valley floor. The Egyptian patrol which had got down some months ago had, before returning to Kuntilla northwards up an easy tributary wadi, tried the going across the Arabah, and had reported on it very badly. They were right. There was nothing for it but to try the shingle beach. But this again proved equally impossible, and it seemed we were defeated. However, working closer and closer to the sea, we found firm going just under the water's edge, and as there was little surf were able to force a way, with many pushings, through the sea.

Arrived at Aqaba, we caused a stir. No one had come out of Sinai by car before. Drawing up at the police post, followed by a crowd of interested Arab villagers, we were received by a huge black police officer of commanding presence. Chairs were brought; we sat down in a row along the wall opposite the official table like exhibits, and were discussed in Turkish. Here we waited, sipping coffee till the Governor arrived. Aqaba is a

malarious mud village of a few hundred souls grouped round the ruins of a small mediæval castle and spreading a little along the seashore. There is a pier, used for a short period during the Great War when the Arab army under Feisul and Lawrence was based on Aqaba for their supplies. In 1926 it was in ruins, disused. Aqaba is the only sea outlet of the country and would become a port if a railway or a commercially practicable road could be made to connect it with the Transjordanian plateau high up above behind the mountain cliffs.

On the arrival of the Governor things began to move. His own office was to be cleared out to make a sleeping-place for us. With some ceremony and much consultation with the Arab operator a message to the authorities at Maan was written out reporting our arrival. It was to go by the newly-erected wireless station over in the old castle.

At sunset a messenger came to say that the Governor invited us to dine at his house at the other end of the village. Such a formality comes as a somewhat disconcerting shock after several days in the desert when the idea of washing, shaving, and putting on respectable clothes has faded out of mind; not that we ever carried anything more respectable than an old pair of flannel trousers and a tie.

The Governor had ransacked the entire village for European furnishings. The chairs, the only ones, were borrowed from our home at the police station. Plates, four knives, and five big spoons were all that could be got. Following the custom of the country, the meat remained alive till we had actually arrived, so there followed a hungry wait round a table during which an Egyptian teacher with some English entertained us. At last, after some local fish, came immense and most welcome dishes of meat and rice. This finished, and our hands washed under a stream of water poured by a servant from a jug, our host,

who till now had waited on us, joined us at table to a round or two of spiced arab tea. We talked, partly through the Arabic of Holland and Maunsell, and partly through the glib Egyptian.

The Governor was an interesting man, a Turk, very keen on his village and its future importance as the seaport of Transjordan if ever the railway down from the Hedjaz line at Maan was built. The Wahabi frontier, still undefined, came to within a few miles of the village and there were difficulties, the Arabs seeing no necessity for belonging to any particular country. He was full of apology for the place and for the poverty of his welcome to the guests of Peake Pasha. The warning from Amman had not arrived till an hour ago. If he had known of our coming things would have been different. The Street Lamp would have been lit.

The track towards Maan was marked out with little heaps of stones as in Sinai. We picked it up the following morning just outside the village, being set on the road by an armed camel escort. The first six miles lay up the Arabah, hugging the wall of mountains on the eastern side; then, suddenly turning, the track led into the mouth of the gorge of the Wadi Ithm, down which Lawrence and the Arab army had marched to the capture of Aqaba. The broken remnants of the Turkish water pump Lawrence had found nine years before were still lying among the boulders. On each side, several thousand feet high, rose walls of deep red rock seamed with basaltic intrusions as if black pitch had oozed up long straight cracks. The floor was a river bed of sand, boulders and loose pebbles. The rock rose sheer on either side, so that in the event of rain and a sudden spate of water, one's chances of escape with cars intact would be rather poor.

Holland's car, still the old-fashioned Model

T Ford with its queer pedal-controlled gears—a Tin Lizzy similar to Bader's and mine—before long began to rebel. It was a year older than ours and had lost its early briskness. Now it sprung a leak in the radiator. All three cars were boiling continuously as they ploughed uphill. After halting for them to cool both the other cars went on, till, finding that Holland was not following and accordingly turning back, it was discovered we had forgotten to push him out of the sand. He and Craig were still disconsolately digging away at the wheels.

After thirty-five miles the walls of the gorge fell away suddenly, opening into the plain of Goweira which it drained, a flat plain of red mud from which isolated rock hills rose vertically without foot-slopes, as if half submerged by a tide of mud. There were green bushes here, and in places a thin crop sprang from fitful Arab scratchings. Beneath a solitary crag to which the track led, we halted for a midday meal at the shell of Goweira police post, burnt earlier in the year by the tribes around Petra. The ruin of a Roman cistern lay near by, and a well at which two rival herds of goats arrived, driven by a couple of toothless old bedouin women quarrelling violently. On the sandstone crag, grained like wood in bright streaks of colour, were spent cartridges from Lawrence's fight here years ago.

Crossing the plain beyond, the track grew softer and softer with fine dusty sand. Holland's car stuck. The other two were going well but stopped to push it out. Once stopped, they, in turn, could not start without much pushing. This happened repeatedly so that our progress was little more than a walking pace. Water was pouring from Holland's radiator, and at every stop a canvas bucket was placed underneath to catch as much as possible, for we had none too much. Several times it was left behind in the general excitement of seeing whether,

after a strenuous push, the car would move on under its own power. Each time the patient Craig, Holland's passenger, had to go back to retrieve it.

The ground began to rise towards the foot of another line of cliffs. In places old lengths of war-time wire netting still lay over the sand. Holland's car got going well, sailing ahead for a mile or more, out of sight over a knoll. We came up with it shortly afterwards, to find it stopped again. Holland raised his arms in despair. "It's all up now," he said, "there's a horrible noise inside the engine. It's bust." The starting handle, hanging free, had grappled up a long stretch of wire roadway which had pulled it backwards clattering against the engine shaft. The whole car was almost supported by the mess beneath. Yards of rusty wire, catching on every projecting bolt and corner, were rolled over and over into a sort of cushion upon which the car was perched.

At sunset we were still within sight of Goweira, but had reached the foot of the last big rise, the Nagb of Shtar, up to the plain of Maan. We were now on the east side of the mountains that had looked so huge from Sinai, and had climbed high enough to look over them, westward into the sun, across the depths of the Wadi Arabah at the country around Kuntilla, and southward too, over the plain of Goweira at red jagged peaks, redder than ever in the sunset, that stretched away range after range, higher and higher, into Arabia.

The beginning of the Nagb was unpromising, being a long steep slope of soft sand with patches of old wire here and there much torn and rusted, but in an hour we got all the cars up it with the help of our own wire and a great deal of pushing. The rest of the journey had to be done with headlights. If it were not for the bitter cold and the thought of a hotel at Maan we should have camped.

Ahead, seen just before it got dark, was an alarming climb of a thousand feet in seven or eight zig-zags up the side of a big escarpment. We filled Holland's car up with everything possible, water, petrol and oil, and gave a final push. It went, Craig helping from behind. We watched with admiration as it did three zigzags before it or Craig or both got tired and stopped. Then another frantic push from all of us and it was off again. With relief we saw the headlights rising higher above us until they disappeared over the top.

In another two hours, having only once lost the way, we were at Maan, spreading out our belongings in one large room in the little inn. The wireless message from Aqaba had arrived. Everyone in Maan had heard about us. A fire was burning and good food cooking.

We looked out, next morning, upon another land. The mountains along the great wound of the Rift were behind us to the westward. Here was a rolling table-land of shingle desert, high up, carrying a cold crisp air. Opposite the inn stood Maan station on the Hedjaz Railway. The bi-weekly train from Deraa and Amman was in, making a great fuss with whistles and steam. Beyond the railway line there was nothing; the eastern desert stretched away like an ocean. Up the road the next building was the guard-room of a detachment of Transjordan Frontier Force with a smart sentry in khaki, red cummerbund and white Arab head-dress. An engine shed, two huts with a small wireless station and two officers' quarters, completed modern Maan, the native village being a few miles off. To the south, the unused railway line ran on into the distance. No train had been south of Maan for several years, though the track was said to be still intact. Before the war the Turks escorted

the train to Medina with a regiment of troops. Now there is no security, and the train does not run.

Having patched up Holland's radiator and called on the only European residents, two very hospitable English officers of the Frontier Force who gave us a note to the police ahead, we left for Wadi Musa along a shingle track leading due west, rising towards the edge of the plateau. In twenty miles the country became green with grass and struggling crops watered by small streams welling out from the folds in low undulating hills.

At the watershed the track dived suddenly down by short zigzags into the head of Wadi Musa, till it ended abruptly in a block of big boulders.

This is Ain Musa, the rock which Moses is said to have struck; from under it there flows a stream that runs on down the valley, and in old days fed Petra. In all the country between here and Suez one is impressed with the personality of Moses, as perpetuated in many Arab names and traditions. He is the one local man whose memory has stuck, even from three thousand years or more ago.

Here we were to leave the cars with half the party to guard them, for it was an uncertain neighbourhood, while the rest went on to the police post to get an armed guard to look after them. But suddenly round the corner of the valley, silhouetted on the skyline, appeared a string of mounted tribesmen each with a rifle slung across his shoulder, led by a fiery little man with a pointed beard like Captain Kettle. Knowing that not so many months before the whole valley had risen and driven out the police, a certain wave of alarm spread through our little party, and hands crept down to pistol pockets. Besides their rifles they were armed with every kind of weapon; their belts so bristled with scimitars, daggers, knives and pistols that there seemed no possible place for any more.

The next minute another string of armed men appeared at a canter; this time the police, with an officer in a long blue cloak and black lamb's-wool kalpac, Russian-looking. He spoke English well in the slow steady way of one who has learnt from books only. He was relieved to see us. Having got a false message of our earlier coming, he had waited for us with horses anxiously, thinking we must have been held up by brigands.

We mounted and rode off, the warlike Captain Kettle and his party behind with the baggage, in single file along the hill-side and down into the valley which soon opened out into a basin to receive several other streams. We were back in the mountains of the Rift. The sun had just set, and a lurid red glare shone up from behind the wild outline of rock ahead, as if, as of old, fire and brimstone were being rained down into the Wadi Arabah beyond.

At our feet lay terraces where figs and vines were growing, and the huddled villages of Wadi Musa. But here, turning into a little mud fortress above the cultivation, and dismounting, our host led us to his quarter where the night was to be spent.

This man, it seems, was the son of a powerful family in the Jebel Druse and had come to Transjordan from Syria a few years before to serve under Peake. In the Great War he had been an officer in the army of the Sherif during its northward march. He was full of stories of Transjordan and its tribes, which he knew intimately, especially those in his present turbulent district of Wadi Musa.

The valley contains several tribes numbering about five thousand people. Most of them are bedouin, living in tents: at this time of year there were only a few of them at home, most being down in the Arabah with their animals. They come up

later on in the spring when the stifling heat makes the depths of the Wadi Arabah uninhabitable.

The village of Wadi Musa consists mostly of store-houses, but there are a few "fellahin" or settled Arabs living there who are tenants of the bedouin, being allowed for a rent of two-thirds of their produce to cultivate the land.

In addition, a little known non-Arab tribe of degraded beings haunts the mountain-side and shelters among the tombs of Petra. They are said formerly to have been Jews but, becoming Moslems some centuries ago, they are known as the Bedouls or "changed ones." May they perhaps be a remnant of the Israelites who are thought to have camped in Petra on their journey northwards through Transjordan?

On the top of Jebel Harun, overlooking Petra, identified by some with Mount Hor where Aaron was buried, is a tomb that no one may visit, being guarded still by a fanatic with a loaded rifle.

The cause of the rising the previous spring, we were told, was obscure; Captain Kettle appeared to have been the ring-leader. It was partly due to an attempt to tax these folk, who in Turkish times had been left severely alone, and partly to some rumour wafted across from Palestine, that they might be dispossessed of their land. But the Wadi has always been a tinder-box. To quote Doughty, who seems to have been not a little frightened in Wadi Musa: "The worthy Burckhardt, who in our fathers' time adventuring this way down to Egypt, happily lighted upon the forgotten site of Petra, found these peasants already of a fresh behaviour"!

Nearly every year they raided across into southern Palestine, just as their predecessors, the Edomites, used to do long ago, invoking the wrath of Saul and David. They had ammunition saved from the

lavish distribution of it by the British in the war, buried in the village and in the tombs. Every man of them, and every boy big enough to carry it, had a rifle.

Leaving the police post on horseback at dawn with the police, an hour's ride (following the course of the wadi, whose stream presently sank into the ground), brought us to the base of the white limestone of the upper plateau. All was now the red Petra sandstone whose cliffs, in which are cut primitive tombs and square isolated rock towers crowned by great urns, closed in on both sides. Not a living thing was to be seen.

The dried-up stream bed, turning a sharp corner, entered the mile-long gorge which forms the only gateway to this fortress-city. The overhanging cliffs, but a few paces apart, rise to two hundred feet, leaving the echoing crack between them in deep shadow except at the top where the early morning sun lights up a band of pink rock-like glowing metal. One of our guards ahead was singing to himself; his voice, ringing up and down the gorge, echoed back to us multiplied from numberless rock faces, was now as the shouting of an excited mob and now softened to the chanting of a choir or the murmur of a great procession of bygone times.

Carved out of the side, a few feet from the ground, were the remains of the water channel which once led the now vanished stream down into Petra.

Then the gorge turned again. An unseen cleft let in the sun to shine full on a great temple front facing us at the bend. To us, still in the dark corridor, it glowed as the painted scene on a flood-lit stage, bright pink and perfect, with hardly a sign of erosion. It looked so new; as if a wealthy madman had had the front of a modern London public

building carved here in this wild place for the sake of its very incongruity.

Here the wadi opens out into the cliff-bound basin of Petra before re-closing to a second and narrower gorge through which the old stream used to run, to topple finally into the depths of the Arabah. Inside the basin the cliffs are covered with the façades of tombs or temples, some complete as the first we saw, some ruinous. None are built of placed stones; all are cut out cleanly from the vertical pink sandstone. To right and left deep narrow clefts branch out into the rock walls. Flights of hundreds of stairs mount clinging to the cliffs, only to end in a precipice where the rock has sheared away. Stairs everywhere; cascades of them isolated on the sides of cliffs a hundred feet up in the air where all else has split away.

We turned up a cleft, mounting four or five hundred feet, sometimes up scraps of old stairs, sometimes scrambling over fallen rocks, to a tall pinnacle, perhaps the old "High Place of Edom" mentioned in the Bible, where stands a great altar surrounded by a complicated system of blood channels leading to troughs and basins.

It would be impossible to describe faithfully the general appearance of Petra, for it depends so much on the observer's frame of mind. The effect of such a remote place is twofold. It is due in part to the direct impression it produces on all observers alike, by its surroundings, its atmosphere and historical background. This impression is there for all to feel, year after year, just as in Egypt the Pyramids are there, only with Petra it is enhanced by the mountainous setting, itself in a deep hollow perched on the unseen edge of the far greater depths of the Arabah below. It is enhanced too by the dimness of its history, by the presence of the so-called tomb of Aaron with its relics of Horite

worship on the peak above, by the Biblical references to this old capital of the Edomites, and by the mystery of Nabatæans who came after them, their unknown origin, the unknown details of their empire that spread far and wide over Arabia, and their unknown worship. Tourists can come in their thousands, but these impressions will survive.

But there is another effect too, depending on the individual and how much his selfish view has been shared by others. In our case there was the added sense that few other people of our generation had seen this place, for regular tourists were not as yet allowed to come. Our appreciation of it was thereby much increased—we were the privileged exclusive viewers of a spectacle. So that to this extent the growing ease of access to it cheapens and spoils. What a profanity would Burckhardt feel were he to have revisited Petra with us by car, protected by police, having originally discovered it at the risk of his life. And in a lesser degree how disappointed we ourselves should feel were we to go back there now, shepherded with a party of tourists for whom every convenience has been arranged.

But beyond all this, beyond the gratifying mental kick of seeing a famous place, there is another more sinister aspect of Petra lurking in the background. "Strange and horrible as a pit," says Doughty, "in an inhuman deadness of nature, is this sight of the Nabatæans' metropolis; the eye recoils from that mountainous close of iron cliffs in which the ghastly monuments of a sumptuous barbaric art are from the first glance an eyesore." It is true. Petra has just that effect. The reason is difficult to trace. Perhaps in Doughty's case it was the recollection of the curses of the old Biblical prophets on the place. But I think it is the seeming cynical likeness which the architecture of the deserted temples bares to the façades of Whitehall. It is too modern, too incon-

gruous. It offends us that an unknown people twenty-three hundred years ago should ever have conceived it.

The bumpy journey of 140 miles northwards from Maan to Amman alongside the Hedjaz railway line had made several repairs to the cars necessary at Amman. We usually reckoned on spending at least half a day on them after every two or three days' running. We knew them fairly well by now, having at one time or another dismantled most portions of their works; and we carried spares for all the bits that were likely to need replacing. There were few constantly recurring troubles, except for broken main springs both front and rear, and worn brake bands for the epicyclic gears. The latter were the chief weakness in hilly countries such as this. They burnt out quickly on long-sustained hills, giving warning of their approaching end by a particular smell of scorched chocolate. Their replacement meant dismantling a large clumsy thing called a transmission-cover with a dozen inaccessible bolts and nuts, each with a still more inaccessible little split pin. The process took a whole morning. The main springs used to break through age rather than from any extra bad bump. We got quite expert at changing them. A front spring took half an hour and a back one two or three hours.

But that was all part of the game. We enjoyed it—at least I did. Everybody craves at heart, I believe, to cease at times from giving orders, and to get down to do some detail personally, to exercise whatever manual skill they have, to feel a pride in contriving something with their hands. It is seldom possible, though. The desire comes only when one is alone, with no artificer to hire to do the job. Who in England would crawl beneath a car to finger oily nuts clogged with black steel grindings

and road dust, when there is a cheap garage round the corner? But where there is no menial to do the dirty work, no specialist at hand, and no custom debarring one from doing work oneself, what a secret joy it is to do it, and what a satisfaction when it is complete, to feel that it has been done properly by oneself who understands!

See us, then, oil-smeared, in ragged shirts, grappling happily in the dust of Amman with those antiquated cars, regardless of the Arab passers-by, knowing that they saw nothing derogatory in our doing things they could not do themselves.

Then came the homeward journey along the same route as on the previous trip—hurrying back as usual before our ten days' leave was ended, down over the terraced limestone hills of Palestine in pouring rain (without hoods because they would snap off when bad bumps were struck), down to the sandy plains where the mountain rain ceased and the desert sun came out, along the old Turkish road into Sinai—Nekhl—the sands of the Mitla Pass—the ferry where the kindly Stephanos welcomed us with beer and buns—Suez, and home late in the evening along the newly-repaired road to Cairo, past amorous Cairenes by the roadside miles from anywhere, their hired taxis stranded for lack of petrol and water.

CHAPTER III

SINAI AGAIN

ONE more trip we¹ did, a year later at Christmas 1927, to that country of the Rift; this time along the bottom of the Arabah itself, northwards from Aqaba to the sunken hollow of the Dead Sea, trying to find a track for cars up from the depths where Sodom and Gomorrah once flourished, into Southern Palestine. A previous attempt had been made from the top by a patrol of R.A.F. armoured cars to force a way downwards from Palestine, but they failed to find the old camel road which Colonel Newcombe's pre-war survey had traced, and had been obliged to return.

Lying in part far below sea-level, ventilated only by the sweltering air of the Jordan and the Dead Sea, cut off by rugged lifeless cliffs from the surrounding territories of Sinai, Palestine and Transjordan on the highlands above, the Wadi Arabah has been since the days of the Nabatæans an unruled no-man's-land across which raiders from the old Edomite country behind the eastern cliffs have for thousands of years passed to loot the settled villages about Beersheba. And lately, as law and order spread over the countries around, the Ghor, or northern end of the Wadi Arabah, had become a sanctuary for everyone who was wanted by the police of all three administrations. But

¹ Captain V. C. Holland, Royal Signals; Captain V. F. Craig, M.C., Royal Engineers; Lieut. R. J. Maunsell, Royal Tank Corps; Lieut. G. L. Prendergast, Royal Tank Corps; Lieut. F. A. Dow, Royal Tank Corps; and myself.

the official attitude towards us had by this time changed. Far from hesitating as to whether it was safe to let us go, we were now encouraged even to the extent of having army rifles loaned to us.

Accompanied by an Aqaba man of the Arab Legion whom Peake had provided, we had ploughed for sixty miles through sand and salt marsh, wheeling the cars gingerly along the mountain's feet over screes of tumbled boulders, or bumping along dry watercourses gouged out by winter showers on the highlands above and lined with tamarisk and acacia. In this winter-time, we had been told, the Arabah was full of tribesmen from the eastern mountains who came down to graze their flocks on the scant vegetation, or to raise some little crop before the oven heat of summer drove them out; yet during the whole day we had seen no one except one very old man, deaf and nearly blind, sitting by a goat-fouled pool of stagnant water. Our guide assured us there were many people here, but they were nervous and had hidden in the rocks at our approach. We passed, indeed, several small patches of dried mud freshly ploughed, whose half-completed furrows indicated hurried flight.

It was nearly evening. On either hand rose the frowning cliffs of Sinai and Transjordan. Three miles distant across the valley to the east the sun still shone on the mountains of Edom, picking out, tier upon tier, naked igneous ranges of green and black rock, and the crimson sandstone whence Edom is said to derive its name of Ed Dum (blood), while far back showed up the white lime downs of the Arabian plateau. Mount Hor now stood out above us crowned by its mysterious little shrine. Behind it, sunk up there in a hollow in the rocks, lay Petra. Maybe it was here, near our night's camp, that Joab slew his twelve thousand Edomites and Abishai his eighteen thousand, and it was

perhaps from those gaudy streaked precipices that Amaziah flung another ten thousand headlong into the Ghor, probably during punitive expeditions prompted by the raiding that goes on even now.

From here began the long descent to the Dead Sea. The dry flood-water courses which afforded the only possible roadway, hesitating at first as to which way to flow, north or south, in the wide valley floor, joined presently to the single flat pebbly bottom of the Wadi Jeib which, as we advanced, cut deeper and deeper into the rubble ground.

Soon, after allowing us a last look ahead into an appalling white sterility of crumbling limestone and salt-crust covering the land as far as could be seen in the glaring haze, the wadi bottom plunged downward beneath the surface of the valley, and its upright walls rising rapidly above our heads to a hundred feet in height shut out all further view.

We were now in a sort of open corridor, smooth-walled and windowless. For many miles we continued blindly down and down. The even and unscalable walls of cemented debris, pierced only by thin black crevasses, impassable for man or beast, curved to right and left in two-mile sweeps.

A feeling of depression was noticeable, caused perhaps by the unusual air pressure at this depth below sea-level and intensified by the interminable descent, the hot fetid air that steamed up towards us from below, the ever-present sense of being observed by an unseen population and of confinement in this unnatural conduit.

Only once did we catch sight of the inhabitants. Two ragged camel riders emerged from behind a growth of tamarisk at which we had arrived. Sliding to the ground, rifle in hand, they were accosted by the Arab with us, and there ensued something of the bristly circling of unacquainted dogs; which ended, the two Ghoranis glided silently

away to disappear, camels and all, within a hundred paces, into the sheer cliff wall; or so it seemed until a movement of ours disclosed a tributary corridor invisible through lack of shadow or other contrast.

At last the watercourse opened out. The cliffs receded abruptly to embrace a wide amphitheatre reaching away on either side to the feet of the mountains. A swamp, in which the stony wadi bed soon lost itself, here covers the whole width of the Ghor, reaching to the southern shore of the Dead Sea ten miles farther on.

It was very still. The grasses of the swamp, eight feet high, heaved uneasily under the slow movement of the air. A row of buzzards on an overlooking cliff, entranced by a sickening smell of death rising from somewhere hidden in the grass, took no notice of us as we passed beneath, merely looking down stolidly with meaty heads. From far out towards the sea some wretched Ghoranis called to one another shrilly through the grass. They alone of human beings live permanently down there through all the terrific heat of summer and the fever-laden vapour of the swamp. They have a legend, I believe, of an old city which was destroyed by a flow of bitumen, but probably this idea has been implanted in their minds by some traveller years ago. Jebel Usdom or Sodom is close by, yellowish-white with seams of sulphur.

Our guide, unfamiliar save by repute with country so far north from Aqaba, insisted on our withdrawal before darkness fell. No one, he said, except the Ghoranis might pass a night in such a place, and being of the same mind we turned away.

The branch corridor fortunately shown us by the two riders on our way down brought us eventually to what we sought, a way out from this enclosed underworld, and at the same time to the beginning

of the very camel track of Newcombe's map, running westward up into Palestine—the old robbers' way. It led us for the whole of another day tortuously upwards through the gorges and stony wadi beds past the shapeless ruins of watch-towers built against former generations of raiders, at last to the fertile ploughed uplands of Beersheba where we were received and given baths by a kindly officer of the Palestine Police.

There were other trips during 1927. In April, immediately after the usual army manœuvres, a party of six,¹ in the same three cars, was organised to visit Southern Sinai.

The only known car route ran down the west coast of the peninsula from Suez for 160 miles to the village and pilgrimage quarantine station of Tor, with a branch leading inland up the Wadi Feiran to the Monastery of St. Catharine. The whole route was then closed to all cars except those of the Egyptian Government owing to an unpleasant accident. A little railway to bring manganese down from the mines to the jetty of Abu Zenima on the coast runs through a cutting where a spur of mountains meets the sea. There being no other way round, the car track shared the cutting with the railway. A party of motorists, having entered it against the signals, had been over-run by a heavily-loaded train coming down from the mines. But now Jarvis was good to us as usual, and a permit was obtained from the mining company for us to use the cutting.

Other than the map, the only information we had about the country was from an old guide-book

¹ Lieut. V. C. Holland, Royal Signals; Lieut. E. Bader, Royal Engineers; Lieut. B. B. Kennett, Royal Signals; Lieut. R. J. Maunsell, Royal Tank Corps; Lieut. G. W. D. Jennings, Royal Engineers; and myself.

which Holland produced. From it we were thrilled to identify on the way all the camping places of the Israelites—Ain Musa, another version of Moses' rock-striking efforts—Hammam Faraun, or Pharaoh's Bath—the Waters of Mara—the Wilderness of Sin—the rock on which Jethro sat, and finally all the associations of the Mount Sinai Monastery itself—the Mountain of the Law—the cleft where Moses hid—the Burning Bush, etc. Fortunately for us, these pleasing traditions had not then been shattered by Jarvis' convincing reasons, which he has set out in *Yesterday and To-day in Sinai*, why the Israelites could never have gone to Southern Sinai at all.

There is an unfailing joy in identifying oneself with the actual sites where great things happened long ago. It appeals to a very human trait in all of us. To be able to say to oneself, "Here, on this mountain top where I am standing now, did Moses receive the Tablets of the Law," or nearer home, in some old house, "This is where the Murder took place!"

This craving for identification leads people to great lengths away from common-sense. Famous places seem to be moved about to suit convenience, each spot being fixed with much exactness on quite imaginary evidence. Instance the former collection of a whole body of tradition around Mount Serbal which until the sixth century was the Mountain of the Law, and the subsequent bulk removal of everything, burning bush, Moses' cleft and all, to another mountain thirty miles away; or, stranger still, the concentration of the Seven Stations of the Cross in Jerusalem to the convenient interior of a single church. The odd thing is that even in the minds of intelligent people the doubts of common-sense seem to detract nothing from the gratification of being at the place tradition has appointed.

If the impressiveness of the surroundings had anything to do with it, I must say the Mount Serbal site of the Lawgiving has it every time. The deep rock-walled Feiran Oasis down in the valley, the great 6000-foot mass of vertical granite towering above would be enough, but add also a dry torrent bed running up into the mountain, filled with black boulders scrawled over with the large symbols of some archaic writing, and the picture, at least to the Semitic giant-addicted imagination, is complete, broken tablets and all.

Of the monastery itself, its history, its ancient library where Tischendorf discovered the famous Codex Sinaiticus, the odd mortuary customs of the monks, much has been written. For those who are stirred by the antique the Sinai Monastery gives the finest example in the world of another quite different sort of antiquity effect. One does not feel it at first, being occupied with the hospitality and old-world courtesy of the monks, the heavy fortress architecture and the obvious struggle for existence up there 5000 feet high among the granite peaks, but after living with them for some days, attending their chapel services, listening to the long Greek chants, one becomes aware that all this has been going on for ages, that the same hymns have been sung in the same language to the same airs continuously for 1400 years. Even the savagery of the Arab conquest passed them by. The whole monastery is an unbroken link with the sixth century, perhaps with the third if one discounts the move from Serbal to the present site. They live in the past. One asks them about this or that silver vestment chest or gold lamp or ikon: "Oh, that," they say; "that was presented to us by our gracious Empress Irene in the eighth century." They are still Byzantines and pray for the Emperor and his officers of State. There is here a sense not only of

a remote past, but of an enormous continuity with the present. Here, as in no other place, can one say: "This indeed is the voice of a thousand years ago."

In addition to visiting the monastery we had an idea of perhaps finding some other interesting routes along which cars could be forced; consequently, as no supplies of petrol were available anywhere in Sinai, it was necessary to carry with us on the cars all we should want for the whole journey from Suez back to Suez again. On former trips the question of petrol supplies had hardly entered into our plans, for each time petrol was available for us in Palestine and Transjordan, and we had never to carry more than enough for four hundred miles at a stretch for a possible journey straight across Sinai and back. Now a good deal more was wanted.

We had by now a very fair idea of the capabilities of the cars and their consumption per mile across various types of country, so that it was possible to think of supplies in terms of miles, and to reckon up how far it was possible to go without refuelling. It appeared that, provided water was available, we could, after allowing for a cargo of food sufficient for a ten day's trip, carry enough petrol on each car for a very long way. I think this was the first time we had thought things out in that light. It dawned on us that we could go anywhere and be quite independent of everything except water for a trip of a thousand miles.

This trip to Southern Sinai had another far-reaching effect; for in pushing on, after returning to the coast from the monastery, southwards beyond Tor, down to the very extremity of the peninsula where no car had ever been before, we felt for the first time a real desire to pioneer,

to open up new routes where others had not already gone. Our attention naturally turned towards the desert West of the Nile, and as thorough-going tourists anxious to "do" everything of interest in Egypt, a journey to reach Siwa Oasis by a new route straight across-country from Cairo was obviously the next step.

CHAPTER IV

SIWA

CONSIDERING that the idea of cross-country motoring started on the edge of the western desert, it is curious that till now we had confined our efforts to Sinai and the eastern country.

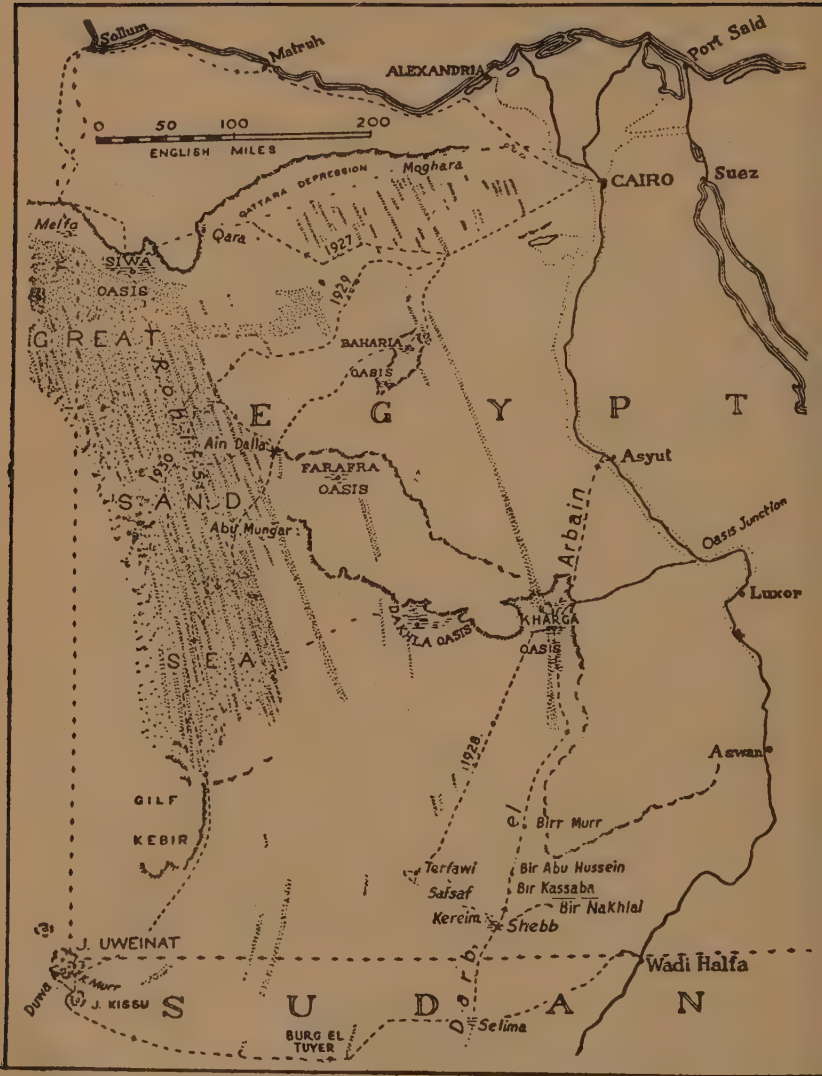
But the fact is that we were a little afraid of the western desert, not so much because it was waterless and entirely uninhabited, but because it was so different from all experience. For water, which forms drainage lines and valleys cutting normal countries up into distinguishable areas, has never flowed in the country west of the Nile. There are no valleys, no landmarks, nothing except monotonous tiny features that crop up in every direction with mocking repetition.

It lures the foolish onwards by its good firm surface, as several would-be sportsmen have found to their cost. Persuaded by rascally dragomen from the Nile villages to go out and run down gazelle with fast cars, they have gone happily on and on till, turning round, it dawns upon them that every direction looks the same, and they are lost. It is an unforgettable feeling; I had already had a twinge of it myself even though I was carrying a compass, on a week-end trip some seventy miles inland from the Nile—not, I may add, that I was out shooting tired gazelle at point-blank range, but merely roaming round behind the Faiyum hills. It is most disconcerting, after one has set a course for some known feature on the map, to find, when the correct mileage thither shows up on the speedometer face, that the

place one is aiming at simply is not there. The immediate instinct is to act—it must be farther on, or it must be off to the left just beyond that rise—and an extraordinarily powerful impulse urges one to move, anywhere, in any direction, rather than stay still and think it out. This psychological effect of the true desert has been the cause of nearly every desert disaster of recent years. Always the lost one leaves his broken-down aeroplane or car and begins an unreasoning trudge, somewhere—it does not matter where. The vehicle is found by planes or trackers sent out to search, but the solitary half-demented walker is too small to spot. If one can stay still even for half an hour and have a meal or smoke a pipe, reason returns to work out the problem of location; it is generally a very simple matter of geometry.

The danger to be guarded against is a very real one. It comes swiftly and unexpectedly. Anyone, however well-balanced, if left alone without a thorough grasp of where he is on the map, or a complete confidence of being able to locate himself by means of landmarks or astronomical instruments, may be seized by this temporary madness, this feverish urge to start moving. And so it had been handed down to us as another of the primary rules of the desert, like that of taking more than one vehicle whenever the beaten track is left, never to leave anyone alone out of sight of a truly dominating landmark such as a great line of cliffs or a mountain peak.

We felt about the western desert much as the tourist feels when he looks out from Cairo at the western horizon, lit up perhaps by one of those wonderful sunsets when it seems the whole land is on fire. "It is the real desert beyond the fringe of which I can never go; only the specialist, the Desert Traveller, can deal with that; it is too big for me to think about."



EGYPT AND WESTERN DESERT, SHOWING JOURNEYS OF 1927, 1929 AND 1930

It was only the delight we had found in enlarging our cars' achievements, coupled with that odd craving for antiquity, which made us try the 400 miles of the direct cross-country journey to Siwa, which even the Light Car Patrols had never attempted. The old idea kept coming back that possibly there might be relics undiscovered a little farther out. For it was said that some remains might still be found of the lost army which Cambyses the son of Cyrus the Great had dispatched from the Nile to go and conquer the Siwan kingdom, and which according to Herodotus was swallowed up in a sand-storm and never heard of again. Alexander, too, had come this way on his return from Siwa after the priests of the Siwan temple had declared him to be a god.

The contrast between the east and west of the Nile is very marked. In the east the country echoes everywhere with past history; every hill and valley has been intensely known throughout the ages. But the western desert has always been a land of mystery. To the ancient Egyptians it was the land of the hereafter—they seem to have started the idea of "going west." The Greeks knew it, from the tales of petrified forests, as the legendary home of the gorgon Medusa whose look turned everything to stone. Even a generation ago practically nothing was known about the land outside the few inhabited oases and the recognised routes leading to them.

This journey of ours involved two new considerations. In the east water was to be had every thirty miles or so. Here there was none whatever, so that as well as having to carry petrol for a possible 800 miles, we would have to carry water too, both for the radiators and for ourselves. On the trip to the Sinai Monastery in the spring of 1927 the cars had boiled continuously, losing as much as two

gallons each in a day, and as it was now but early autumn the weather would be just as hot. We realised that cars do not use much water by actually boiling it off in steam, but that the steam blowing violently down the narrow overflow pipe provided in all radiators carries with it a great quantity of water splashed up by the boiling. All this could be saved if the overflow were led into a special tank, even if the steam itself were lost. So we blocked up the overflows of the radiators, and in their place soldered large copper pipes to the filler-caps, joining them by other tubes down into two-gallon cans bolted on to the running-boards of the cars, so that the only outlet from the radiator was at the end of a pipe immersed in cold water at the bottom of a can. When the water boiled in the engine a mixture of water and steam was carried over into the can where all the water was saved, and so, until at last the water in the can itself began to boil, the steam was condensed and saved.

Though I am told the same idea was evolved by the Light Car Patrols during the war, it seems to have been forgotten like many other things in the following years of reaction. It was evolved anew by Bader and myself after several false starts with more complicated arrangements which did not work. The beauty of the idea is that it saves water in another way also, which we had not thought of; for by leading the connecting pipe within reach of the driver's hand, it enables him, by feeling if it is hot or cold, to tell exactly when the circulating water is starting to boil. He then turns his car round till its head points into the wind, and stops to let things cool down. After a minute or so, when the steam has condensed in the radiator top and formed a vacuum there, the water rushes back out of the can with a loud gurgle, and the radiator is full once more.

This solved our water problem. During that trip of 1100 miles we never once added water to our cars. Afterwards we hardly ever even removed the filler caps to look inside.

The other consideration, which had hardly arisen before, was navigation. For although a lot of survey work had been done by car and compass during the war by patrols working from Siwa, from the Nile and from various bases on the coast, there were still wide gaps of unknown country between. Moreover, practically the only existing features were parallel ranges of sand dunes; it was not certain whether all these were on the map.

The time-honoured method of keeping track of where one is in unknown country is to fix the bearing of a distant feature ahead with a prismatic compass; go to it and check back if possible to the point one started from, repeating the operation for the next conspicuous point, and so on. With cars it is necessary at each point to stop, get out with one's compass, and walk away till one is clear of the magnetic disturbance caused by the steelwork of the car, which often upsets the compass by as much as fifteen degrees. In the western desert, where there are no conspicuous features at all, where an endless succession of low horizons follow one another a mile or so apart, all this becomes impossibly slow. An alternative, satisfactory as long as the course is straight, is to find out the error of the compass when it is in the car and the latter is pointed in the required direction, and make an allowance for it. The error will be quite different for different courses, so that at each change of course one has to stop to check it. As on land one can seldom keep a straight course for very long owing to the necessity of making detours to avoid hazards such as sand drifts, rock outcrops and little cliffs, this method too is very slow.

The compass can, of course, be fixed to the car

and used as a ship's compass by compensating with adjustable magnets for the magnetic disturbance of the car. But a car is not like a ship or even an aeroplane. There are generally too many movable steel parts near by, such as gear levers, spare springs, etc., the shifting of whose positions may seriously affect the compensation. I tried this method in 1929 on a Ford truck, using a first-class aerocompass, but after many attempts at compensation, trying the instrument in various places on the car, I was never able to make it accurate in all directions nearer than four degrees. It depends largely on the make of car and the kind of steel used. There may be places on some makes of car where a fixed compass can be mounted and compensated with far greater accuracy, but this is not much use unless the particular car is suitable for cross-country work, and this can be said of very few indeed.

On a preliminary run one week-end in September to take a load of petrol and water in advance to a point 120 miles out, we were forced, through lack of time, to do much of the distance after dark. We steered by pointing the car's nose at a star low on the horizon, checking its bearing by compass every now and then as it moved round. This set me thinking that the sun could be made to act instead of landmarks. More than this, if its position were known at any time it could be made to act as a compass too, eliminating all the uncertainties of the magnetic compass, for one could read off the bearing of the car from the position of the shadow cast by a vertical needle on a graduated dial. All that was wanted was a second set of graduations by which the whole dial could be turned round to follow the horizontal movement of the sun in the heavens, from east to south and south to west. As the sun's bearing in the sky is known, and can be looked up from published tables, there was no difficulty about

the dial setting, which need be done only every quarter or half-hour from notes extracted from the tables each morning.

I had the first sun-compass made up by the end of September and trials found it most successful. It gives, of course, true bearings instead of magnetic ones, it is dead-beat and very clear to read. To steer a course, all that is necessary is to keep the sharp black shadow of the needle on the required figure on the dial, which, if silvered or painted white, shows it up even if the sunlight is partly obscured by thin cloud.

* * * * *

There is something very attractive about Mena, on the Nile valley's western edge, the gateway from Cairo into the western desert. It is a place of violent contrasts. The intense green of luxuriant irrigated crops changes without warning to bright blue sky and to bright yellow sand. The modernity of Mena House Hotel at the end of a broad asphalt avenue, bustling with cars and life, is overshadowed by the great 4th Dynasty Pyramid group towering 400 feet above. Trees, fields and plenteous water are separated only by a canal bank from the barren lifelessness beyond. Modern Americans in curious hats sun themselves on the platform of the Great Pyramid, mounted upon camels that blend with nothing but a native background. All the constrictions of civilisation, walls, fences, conventions and police, surge up vigorously to the limit of the sown, there to shrivel to nothing before the freedom of the desert.

After leaving Mena, past the Pyramids and their surrounding tombs, nothing remains of men's doings. A crumpled slope of black flint pebbles and drift sand lying on a soil of powdered clay rises gently westward to a little ridge of rocks eight miles

away. Beyond this ridge, looking back, one sees the three triangles of the Mena Pyramids setting rapidly beneath the eastern horizon, then all is gone. A floor of pebbles and flat hard sand, ever changing in hue from white to yellow or grey with the sun's position and with the passing of every filmy cloud, stretches away into the distance where only the tops of a few flat plinth-like objects, the remnants of some high-level plateau long since removed by the wind, peer over the horizon. Presently these disappear below it to reappear again when one is ten miles farther on, a vague indication that the face of the world is not quite flat after all.

In the first fifty miles we¹ met gazelle which, never drinking, graze on occasional blades of dew-fed grass. Startled, they would bound along regardless of direction, sometimes even converging on us in their flight. Then even these were left behind. The yellow plain gave place to a series of shallow basins between low winding ridges of sun-browned shingle, their slopes crinkled into imitation brooklets where nothing has ever flowed but sand.

Horizon followed pebbly horizon interminably. Occasionally on our right at intervals of ten or twenty miles as we drove westwards, the noses of long narrow sand dunes could be seen end-on, reaching down towards our route from over the skyline in the north. The sun, lighting up their steep white cones against the darker floor of the land, gave them a semblance to the sails of distant yachts. Sometimes they could be seen so that bits of their lengths were visible, looking like the bleached vertebræ of huge serpents laid out straight over the

¹ The party consisted of Lieut. E. Bader, Royal Engineers; Captain V. F. Craig, M.C., Royal Engineers; Lieut. R. J. Maunsell, Royal Tank Corps; Lieut. G. L. Prendergast, Royal Tank Corps; Lieut. I. B. Fernie, Royal Tank Corps; and myself.

curve of the world, notched saw-toothwise by hollows a hundred yards apart in the chain of high uniform sand cones.

About our own route the only objects to be seen were the great gnarled trunks of petrified forest trees lying partially submerged, as if floating, in the powdery ground. They were scattered everywhere over the country, sometimes singly, sometimes in tumbled heaps, mostly intact save for the leaves and smaller branches. One could see the details of the bark, the very pores of the wood and the knots from which big boughs had parted. Broken splinters thickly mingled with the flints tinkled on one another steely hard under our wheels; for all this tropical life has been turned ages ago to a stone so permanent that untold centuries of driving sand have not defaced it. It was a dead world upon which all life, all movement except that of the wind, had ceased from the far-off time when the primæval Medusa had looked out over the land and petrified it for ever.

At sunset we searched for a camping-place, trying to find some shelter from the night wind. Even in the early autumn, when the day temperature is round about ninety, the thermometer falls fast directly the sun goes down, and the nights are cold. But there is little real shelter in this country where the wind, to suit its own purposes, has long since moulded the surface into streamline curves. There is another consideration though, in choosing a camp site in the desert. There should be a fairly level stretch of drift-sand to provide a soft clean sleeping-place free of the usual stones and powdered clay. Or if this is not possible, there must at least be enough blown sand near by to use for washing-up the plates and cooking-pots.

We halted behind a low bank, a hundred miles from the Nile. The cars were faced inwards as usual, so that their headlamps could be used for

lighting things up. We got out and stretched ourselves, ready to enjoy the best bit of the day—the relaxation in the coolness of the evening from the considerable effort of driving all day over uneven ground, always on the look-out to avoid rocks and soft places at a moment's notice.

The navigator, myself, gave his version of where we were—received somewhat sceptically by the others, for after all with no landmarks about it is a little difficult to accustom oneself to the fact that one really is at any particular place—and got down to mend a burst tyre, while the other two car drivers, Bader and Prendergast, paid various small attentions to their cars.

This was Prendergast's first trip with us. He had arrived in Egypt the previous winter from the Tank Training Centre, but had been stationed with a detached section of armoured cars at Alexandria. He had already been enticed into buying a Ford for desert trekking. Prendergast was a thorough hand with cars; he treated them from the first, as we had grown to do when alone with them very far from help and entirely dependent on them, as faithful beings who would give any service if properly looked after and their needs understood and satisfied.

The three passengers meanwhile bestirred themselves about the evening meal. These nightly camps had by now become very much of a routine. Craig had from the beginning taken charge of our food supplies. He knew instinctively how much and what sort of food we needed to suit any mood we happened to be in; his rations for a whole trip always worked out right to within a tin or two, and at any moment, even in the dark, he could reach down and put his hand on just the tin he wanted in the correct case buried under odds and ends in the right car. He had a special sense of food, learnt during long months of train journeys across Siberia

in Koltchak's war, and afterwards in yachts at sea.

Water was rationed and used for drinking only, as tea except at midday when we had a pint each with limejuice. It was kept as before in two-gallon petrol tins bolted in rows with similar tins of petrol along the running-boards. When wanted, the water was syphoned out with a piece of rubber tube, to avoid the trouble of unbolting the tins. In one special two-gallon tin was kept the water in which those tinned foods were boiled whose containers happened to be coated outside with paint or varnish that might get dissolved; but if they were clean tins they generally went straight into the tea water while it was heating up, to save time and fuel. Thus no water was wasted for cooking purposes.

In addition to the petrol carried in tins along the running boards, there was more in four-gallon tins done up in the usual commercial wood case containing two tins each. These cases were emptied, as we progressed and petrol was consumed, at the rate of about one case per hundred miles per car, so that at the end of a day's run several cases were empty. After being used as tables and seats they were usually thrown away.

It is curious how firmly rooted the idea was that the ordinary petrol stove was a necessity. It always gave trouble. The jet kept getting choked with fine sand grains, the pump would leak so that the flame slowly died away, and in a wind it was always blowing out. Nor was it particularly quick in boiling a large quantity of tea for six thirsty people. But for some reason, even after the simple discovery which I now relate, we carried the stove about as a sort of tradition.

Our stove had got left behind at a previous halt, so that an improvised fire was wanted. The square top of a four-gallon tin was cut off and a stoking

hole made in the bottom of one side. When the deep cooking pot was lowered in, its handles rested on the top edge of the tin, leaving some six inches underneath for the fire, whose flames played round the cooking pot and up the four corners of the tin. The empty unwanted petrol cases were broken up by hand and the thin dry wood fed in as required. We found that the wood of one case would cook for the six of us for more than one meal, both for boiling tea and for frying; and it did it in a third of the time taken by the petrol stove. In a high wind all one has to do is to turn the fire-pot round till the hole at the bottom is sufficiently sheltered. Thus the cooking problem was solved, just as the water problem had been, in a way which made for unexpected economies in packing space and weight.

We dined, sitting on the sand with the cars around us, while a light wind, already getting chilly, wandered about in soft gusts, bustling from mound to mound aimlessly in the darkness outside. Each of us then washed his own plate and other utensils in the clean dry sand and very soon settled down for the night in blankets and sleeping-bag, choosing his own particular patch of soft sand. Occasionally, as the temperature fell, a car would creak—sharply, like a pistol shot, in the surrounding silence.

Early next morning, twenty miles farther on, the first object was sighted which would connect us with the map—the nose, or southern limit of the Ramak dune range. Extending farther than the rest, and, like them all, uncrossable by cars, this range had determined our course from Cairo, for we had to skirt round it. By good luck we found ourselves no more than two miles off our course on the run of 120 miles.

Up to now there had been the wheel tracks of former cars leading hither and thither to unknown

destinations; some fresh, some many years old, some maybe belonging to the original Light Car Patrols that roamed over this country years before. Each wheel, pushing its way through the light covering of pebbles, leaves behind a groove where no pebbles are. The wind not being strong enough to shift the pebbles, the groove remains either empty or filled up with blown sand. There is no knowing how long these tracks will last. Nothing will destroy them except continued rain, and far inland it may be twenty years before a single shower falls.

We tried to identify some of these tracks by their age, by the width between each pair and the depth of impress, somewhat as a bedouin tracker reads a camel mark. But most were Fords, and so were identical except for age. Some, however, were distinct. Once or twice we crossed the thin double groove of Prince Kemal el Din's fleet of Citroen caterpillars. Then there was his cousin's grooves too, Prince Omar Toussoon's, thicker and broader, made by six-wheeled Renaults. Here there were fresh tracks. "Fords," we said. "That must be P. A. Clayton of the Desert Surveys, who was out here a month ago." Or again, "Two cars only, and going south-west; old, before last winter's dews. Probably an F.D.A. Patrol going to Baharia Oasis."

The tracks were strewn about in bunches of two, three or four pairs of grooves together, crossing and recrossing one another in the bunch, loosely like pale silk threads lying thinly about an enormous patchwork carpet of darker brown and yellow. For forty miles or more there would be none at all. Sometimes for a short distance a bunch ran in our direction. Over good stretches all the tracks of one convoy would keep close together, crossing and overlapping. Then came a bit of soft going, and

there would be a difference of opinion between them; they would separate, each searching for a better way. Once, with a little shock, we came on our own tracks of a year before, recognised by a trick of Holland's of playing trams by following for amusement exactly in the tracks in front.

Beyond the sixty-mile barrier of the Ramak dune range there were no more tracks. We were alone with the stone trees and the dunes. We did 150 miles that day, skirting the tapering noses of one dune range after another, as before. They were all identical in shape; long narrow chains of sand-heaps connected by crests of sand pouring over to one side or the other like unclipped horses' manes. Their width is but a hundred yards or so, and height a hundred feet, yet they run as straight as if artificially made, for thirty miles or more without a kink or break, each range exactly parallel to its neighbours, a mile or so away. Each is a separate entity having nothing in common with the surrounding land, which is in general free of scattered sand and dark in colour in contrast to the pale shining dune. The boundary is marked by a clean-cut edge of colour a few inches wide as if the sand is kept swept up neatly with a brush.

There is little doubt that the common direction of the dunes coincides with that of the prevailing wind, but their geometrical straightness over such a length is uncanny; there is nothing known in nature on a larger scale than a pine tree which goes in for straight lines, and yet these things run from horizon to horizon unbroken. And something unexplained makes them identical one with another, each with a head and tail of definite shape. Some influence repeats their peaks at equal distances apart, cuts their curves to one design and prevents them scattering with the wind to form the haphazard little heaps of sand which occur in slightly less arid

places. They must have been growing for thousands of years to have reached their present length advancing southward yard by yard like notch-backed caterpillars. One had a feeling that something was still going on, that the old Gorgon of the myths, in destroying all forms of life as we know it, had but freed the sand to organise itself into these huge forms, and that a creeping movement, slow but inexorable, was taking place even as we were among them.

The general lie of the western desert is curious. Southwards from the Mediterranean a coastal plateau rises gradually to a height of some 600 feet; then the land drops suddenly in a single continuous thousand-foot cliff to a depth well below sea-level. This cliff is the principal feature of the northern country, and runs westward from near the Nile for four or five hundred miles far into Italian territory. The trough beneath the cliff varies in depth, but it is deep enough to tap the level of an underground water supply draining north-eastward from far away in Equatorial Africa, so that in places along it there occur springs of fresh water which result in patches of vegetation and also in large oases such as Siwa.

In the deepest part, called the Qattara Depression, there is no fresh water, but only a long narrow salt-marsh, winding like a petrified river close beneath the cliffs. It is into this area that Dr. Ball proposes that a tunnel shall be cut which will let in the sea at a high level, and to utilise the considerable fall in height to generate electric power on a very large scale to meet the needs of the whole of Egypt. It is calculated that a large lake will form, but that as its area swells in size so the evaporation will increase till an equilibrium is established with the rate of inflow from the sea. The lake will then cease to

rise, and a supply of power will be assured for many centuries, until, in fact, evaporation finally ceases with the solidifying of all the water in the lake as crystallised salt.

South of the line of cliffs the land again rises, very gently; and it is here that the sand, produced presumably by the action of the north wind as it swirls over and erodes away the cliff, strings out southward in the long fingers of the dunes. Some hundreds of miles farther south still, the ground drops again in other great steps, to the level of the same artesian water, forming the cliff-surrounded oases of Baharia, Kharga, Dakhla and Farafra.

On the following day we joined the old camel road, the Masrab Mahashash, by which Alexander the Great returned to Egypt from Siwa. Whereas up to now we had taken the more direct route south of the dunes, the Mahashash kept to the north of them, following the depression to take advantage of the one or two spots where water is fit to drink.

How this dead petrified country with its legends of Medusa must have stirred the young mystical mind of Alexander, already keenly affected by the secret words of the oracle at Siwa. This was his first journey across a true desert, entailing transport and supply arrangements he had never made before. Perhaps afterwards it was the memory of this successful experiment which decided him to attempt the less fortunate journey along the Makran Coast on his return from India.

We followed the Mahashash across a river of salt to the north side near the cliffs, a voyage of five miles which took an hour, lifting each car wheel in turn over foot-high waves of upthrust salt slabs—more evidence of Medusa, a 150-mile river turned to stone! The old road led on until at midday, crossing a wide spur of the cliff, we came to the tiny oasis-town of Qara lying in a mile-wide hollow

almost surrounded by the cliffs. A few meagre date palms struggled for existence in glistening salt-encrusted ground. In the centre of the little basin, stuffy and low-lying, rose a solitary white mushroom of rock with curved overhanging sides whose lower portions the wind has cut away. The little town sits atop the mushroom, a single mud-cap edged by a high smooth wall, impregnable to raiders, with one black tunnel for a street into which open windowless cells without ventilation. It is really a suburb of Siwa, being only seventy miles away. The few dozen Siwans are miserably poor and live by trading in the few dates the place can grow.

Looking down on Siwa from the heights of the northern cliffs ten miles away, one sees a long strip of greenery varied by deep blue lakes, laid out in the distance along the wide floor of the depression—forests of date palms, gardens and small fields, a truly joyous sight upon which generations of hungry nomad tribes must have looked with envy.

But on closer approach it is seen to be not quite such a paradise as it first appeared. It never rains down there. As with all the Libyan oases, the life-giving water coming only from below, the people battle perpetually with salt which slowly impregnates all the soil unless washed out by fresh-flowing water. Fortunately the fresh water often bubbles out under considerable pressure so that the mouths of the springs can be raised, allowing of a flow of water downhill through irrigation channels. Near the source it waters and drains fruit gardens and crops. Farther on, now brackish, it supports only coarse grass which cattle eat, and the ground is salt-encrusted. Finally, it reaches the salt lakes around which only date palms grow. The air, hot and breathless, has a characteristic oasis smell,

slightly sweet, of rank grass faintly charred, decaying through increasing saltiness.

The track we were following became a lane winding through the date forest. On either side were high fences over which hung sweet limes and pomegranates growing in carefully watered gardens shaded by the palms above—all gloriously green. Villages appeared—Aghurmi, perched like Qara on a rock, where are the disappointing ruins of the great temple and oracle of Jupiter Ammon; then, in an opening, two conical hills; one natural, of sandy limestone; the other artificial, of crumbling mud.

Always in fear of raids from the nomads, the Siwan villages became sheer-walled fortresses of mud which the increasing pressure of population forced upwards house on house to form airless anthills of passages and donjon dwellings. The old town of Siwa grew to so high a pyramid that the Egyptian Government, deeming it unsafe, ordered the people to move out and to build a new town near by. Old Siwa, the most interesting feature of the Oasis, is now therefore derelict and fast crumbling away.

It was late afternoon when we arrived. The Government rest-house was occupied by high officials of the Egyptian Army come by the normal coastal route, so we were obliged to spend the night in the open. This meant either retracing our tracks towards the northern cliff to the clean country beyond the oasis limit, or going south to the border of the dunes whose golden domes and pinnacles were shining in the sunset. With one accord we chose the south, attracted by the idea of camping for the first time on the very edge of the real unexplored.

For beyond Siwa to the south and south-west lay the Great Sand Sea, where the map of Egypt faded away into a blankness stippled vaguely to

indicate sand, and ended with the final stimulating remark, "limit of sand dunes unknown."

It was bright moonlight that night and the sand was cool. While the others were preparing for bed, Bader and I, irresistibly called by the sand, set out southwards on foot. The surface, flat at first, began to heave in huge billows of loose grains, rising higher and higher above the ground. Looking back, before the landmarks of Siwa disappeared entirely below a sand horizon, we could see clearly enough the long black line of palms, and in front two pairs of tiny lights where our cars' headlights shone. It would be easy, we thought, to return to them guided in addition by the moon's position in the sky. But we lost count of time, fascinated by this new world of great curving silhouettes. We considered the possibility of taking the cars out here. All experience was against it. Cars could never cope with dunes. Even though the surface was quite firm over wide patches, if a car once stuck it would be impossible to get it out. And just then our feet sank ankle deep, the whole texture of the sand having changed without any corresponding change in its appearance. We waded on heavily for a little before turning back, convinced once more that one might as well try to walk across the sea as drive a car over these bottomless sand accumulations.

Light clouds formed obscuring the stars, though the moon was still visible hazily. We lost our outward footsteps. Returning northwards we reached the edge of the sand plateau and could see again the black line of the palms; but several lights now shone, separately, miles apart. Our camp might be anywhere; the twin pairs of headlights were nowhere to be seen. We walked on vaguely towards the centremost of the lights. It was very upsetting. We felt great fools for not having taken things more seriously going out. But then we never meant to

go for more than a stroll. Now we might be miles away from our camp and might have to wait till daybreak to get back. One of the lights, however, was redder than the rest, and turned out on approach to be a fire. We went to it. It grew dimmer rapidly, but just lasted till we reached it. By amazing luck it was our own camp fire. The others, unthinking, had turned out the headlamps to save the batteries and gone to bed.

One thing I regret in all these trips of ours. That is the continual hurry we were in. It was always the same. Everything we wanted to see meant a journey of a thousand miles, and ten days seemed to be the most that the various members of our parties could afford to spare from their annual allowance of leave. Having discovered what could be done with cars, we always wanted to do as much as possible. Probably we opened our mouths too wide, and should have been content with less distance in the time we had, pottering for several days at each place, making little excursions on foot, talking to the people and photographing their life, as travellers on camels traditionally should. As it was, we were rarely able to spend more than a day at any place, however interesting it may have been.

But perhaps some of us, the car-drivers especially, enjoyed the actual travelling, exulting in the skill it called for and excited by the wild desert country around, rather than by sight-seeing in native villages whose people and customs we felt have already been described in detail in many books, by experts who had ample time at their disposal. Perhaps to some of us the sight-seeing was really an excuse for the journey.

Anyhow we were off again the following afternoon, spending a mere morning in Siwa. It was

a very pleasant morning though, once the coffee-drinking formalities with the local government were over. We bathed in one of the springs—a bottomless shaft, stone-lined by the Romans, of clear water through which columns of bubbles rose bursting on the surface with a splash, as in a huge soda-water bottle. We were taken by an escort through a small portion of the labyrinth of tunnels in Old Siwa; we wandered into gardens and were given as much fruit as we could carry; we visited the date market, sampling from the many different varieties for sale.

There still remained four hundred miles of petrol on the cars, reserved as usual for an emergency return to Cairo on our tracks, in case for any unforeseen reason we had been unable to reach Siwa; and a further supply had been sent to Sollum by the fortnightly ship from Alexandria. So it was decided to push on westward to the border of Italian territory.

Climbing the northern cliffs again by an easy camel road, we drove on west along the top, above the straggling line of depressions with their distant salt lakes and patches of green. At times there were the cars track of the Frontier Administration to follow, or the wavering parallel paths of some old camel masrab; at times we picked our own way by compass over an uneven stony country.

Always on the southern skyline the dune masses of the Sand Sea rose into clear-cut twisting ridges merging into one another, and shining pyramids of sand. One cone in particular near Melfa is believed to be over five hundred feet in height, but the ground is at an unknown depth below its base. The wind was blowing gay sandy plumes of smoke from their summits. They shone with a dazzling light, wobbling with mirage, and under the thin shadows of passing wisps of cloud one could imagine

that they danced together, waltzing round, one summit changing with the next, mockingly, unconquered and uncrossed, guarding the great central stronghold of the sand.

The second day we struck a well-worn track of Italian armed convoys. It was hard to believe that in all this emptiness a war was going on, and that a sufficient force could rise from nowhere to attack Italian columns of many lorries carrying food and water to the outposts. Later on we came on one of these posts, a barbed wire circuit, some wood huts and a tall wood watch tower on which a huddled sentry stood, looking intently towards the western horizon. Poor frontier post, with a handful of Somalis under an officer fresh out from home, defended not against the foreigner over the eastern border, but against their own tribes within!

Feeling out of place here, we struck out on a north-east compass course towards the coast. In seventy miles the barren area of stones ceased, and we entered the Red Desert that reaches to the sea. The sky near the coast had been cloudy for several days, and towards night a cold wind sprang up bringing showers that soaked us through. Nearing the coast next day the vegetation increased. Camel thorn and other desert plants grew in every red mud hollow. The rain had been heavy here; sheets of water lay about.

The frontier post of Sollum lies in a little barren bay hollowed out of coastal cliffs, and approached from inland by a precipitous descent. A single hut-lined street ran along the shore, with a stone jetty with one side collapsed, where came a single ship once fortnightly. But a spotless little Government rest-house was perched aloof upon a rock complete with servant, table-cloth and eggs.

There had been rain and the little town was happy. The bedouin up above on the plateau were happy

too. Presently they would be rich with good grazing and come down to buy. The times had not been good, for the frontier had been closed for some time owing to the chronic war in Cyrenaica, and no tribesmen from the west came into Sollum to trade.

CHAPTER V

THE DARB EL ARBA'IN

THAT winter I got unexpected orders to sail for India early in February by troopship.

On the whole I was quite content at the change. I had, as I thought, done Egypt fairly well, having seen everything I had heard of as being worth seeing within a radius of 400 miles of Cairo. There were many other things to do besides motoring across corners of the desert. A period seemed to be over.

There would have been nothing more of the desert to relate had it not been for one small item, a report received in Cairo that a few locusts had been seen in a tamarisk bush 500 miles away, on the Sudan border.

It was the beginning of January 1928. All my kit was packed ready to leave for India. On the 13th I received a sudden visit from N. D. Simpson of the Cotton Research Board.

It appeared that away up in the southern desert 300 miles south-west of Aswan, a low-lying strip of country existed where the underground water came close enough to the surface for some vegetation to grow; there were palms and tamarisk and wells. Simpson spoke of Shebb and Bir Terfawi, neither of which places had I heard of. They had been put on the map by Dr. Ball, Director of the Desert Survey, when he had accompanied Prince Kemal el Din in 1925 during the first of the latter's great expeditions far away to the west.

European or native, no one had been to this

country since, till Mr. Beadnell the geologist called at Bir Terfawi a month or so before on a mission to find out how much farther west this area extended where water could be got by digging. One of his men had just come in with a report that there were locusts on the surrounding tamarisks, looking as if they were ready to lay eggs. The Government were alarmed, for it might indicate that a locust plague was imminent. A plague had been expected for a year or more according to past records which showed that the worst plagues came at intervals of roughly ten or eleven years.

No one in Cairo had much idea of how much vegetation there might be there, or how great a swarm of locusts could grow upon it, but the Government had decided to send an expedition out at once on the chance of being able to catch a potential swarm before it took wing for the Nile Valley, by poisoning the vegetation round. If the menace was found to be serious there was an idea that the whole Royal Air Force in Egypt would afterwards co-operate by dropping more poison from above.

The expedition, with Simpson in charge, would start in four days' time. He had been told only the day before, and that morning had discovered from the Frontiers Administration that though the latitude and longitude of the place was known, it could be reached (unless the previous car tracks, now fairly old, were still visible all the way) only by steering a compass course for 200 miles across the entirely unmapped and featureless country south-west of Kharga Oasis. They had suggested that I should be asked for from the British authorities to act as navigator, since none of the Survey people were available.

Naturally I jumped at the chance. It meant missing my troopship, but by flying by the air mail

to Baghdad and taking the Persian Gulf mail steamer from Basra, I hoped to get to India by the required date.

Simpson hurried off to continue his arrangements. I still wonder how he managed to get everything done in time—food supplies and medical necessities to be obtained, experts none of whom had been in the desert before, and their gear, to be extracted from more than one Government department, transport to be bought and money obtained to pay for it, a special train to be arranged to get the cars to Kharga (since by no known way could cars be driven down the cliffs into the Kharga depression), maps to be got and the Survey people to be interviewed—all in a space of three Egyptian Government days of a few hours each.

It was thought at the time that nothing but six-wheelers would go over that sandy desert S.W. of Kharga. Fortunately, M. Leblanc of Renault's had three demonstration six-wheeled lorries in Cairo, so Simpson bought them straight away, Leblanc agreeing to come himself with two of his mechanics provided he was allowed to bring his own cook with him. At the last moment it was found that the railways could not get the cars up the Nile in time, there being but one express freight service a week, so the House of Renault set out independently by 350 miles of unreliable mud roads that meander casually along canal embankments up the valley, zigzagging amongst the complicated irrigation system over canal bridges, regulators, drains and syphons, to Oasis Junction, where the cars were to be put on the narrow-gauge railway running out to Kharga.

I met the rest of the party for the first time on the night train at Cairo station. At 4 a.m. on the

following morning, the 18th January, a group of sleepy passengers stepped out of the warm comfort of the Luxor Express. The engine whistled irritably at having to stop at such a place as Oasis Junction, and the line of sleeping-cars with their moneyed tourists glided away into the darkness. There were no lights at the junction. The occasional passenger for the one weekly train to Kharga did not warrant such an extravagance. A bitter Nile fog hung about. We groped our way across to the toy train whose unlit outline we could just see. A few natives slept on the platform anyhow, like heaps of sacking. We tripped over them, and one or two of them got up grumbling to help us sulkily with our baggage. The one passenger compartment had only three seats and smelt of stale humanity gone cold. We waited miserably for several hours.

An engine arrived with the dawn, after which the platform woke up. Under the guttural abuse of a head-man they began slowly to load a truck with our supplies, dumped there by a previous train, while we huddled for warmth against the wheezing little engine. Presently the train moved off a few miles to the desert edge, where it stopped for several more hours, while we breakfasted and felt better. Spirits so far revived that the entomologists got out their nets to chase butterflies.

At last the train was on its way, puffing up a rocky wadi to the western plateau. The cleft of the Nile Valley dipped and vanished. Every so often we stopped at a wayside cistern buried in the desert, while water was poured into it from the train so that maintenance men could live along the line. Parties of them came up to get their weekly pay from an important official with a green baize table in a truck near the engine. Meanwhile the crowd of bedouin on the truck-tops strayed about and had

to be collected before we could go on. Between cisterns we also stopped while the engine-driver, dismounting, climbed a telegraph pole to disentangle wires.

Simpson the botanist looked in vain for plants. There was nothing but rock, hard grey limestone worn smooth by sand-blast till at some angles it shone as burnished platinum in the sun. In places spherical boulders sat about over miles of country like fields of water-melon.

Towards evening the plateau fell away ahead, and the outline of distant cliffs rose opposite in the west across the great depression of Kharga a thousand feet deep. The train began to climb down the escarpment from terrace to terrace with much squeaking of brakes through a succession of jagged gorges half filled with sand drift which in places overflowed the rails.

The cliffs surrounding the north and east of Kharga, like those overlooking Siwa in the north, form part of another great escarpment separating Egypt west of the Nile into two portions north and south. In all the several hundred miles of cliffs there was then no known pass by which cars could descend to reach the Oases of Kharga and Dakhla from the plateau above. Every car for use in the southern area had to be brought across from the Nile by the little railway line.

Across the bottom of the depression the railway is fighting a losing battle with the sand, for the 300-mile column of the Abu Moharik dunes, creeping down from the north, has reached the cliffs and pours over year by year, while its advance guard of isolated dunes marches down the length of the depression *en échelon*, rolling inexorably over villages, palm groves and springs. Abandoned lengths of railway track show where old diversions have been made to let a dune move through.

It was dark when we reached Kharga station after a journey of fourteen hours. Dinner in the little four-roomed hotel was a scratch affair. The floor was covered with our kit and most corners were littered with potato sacks, some of the 500 lbs. of poison, and boxes of various odds and ends. The meal consisted of turkey, which forms the principal meat supply of the oasis, but that night its relish was spoilt by a powerful smell of cyanide issuing from the direction of the kitchen. Luckily it was found to come merely from an entomological killing-bottle which the one lugubrious waiter had opened and upset during a search for drinks for us.

The next day Simpson completed his supply arrangements with fresh local food from the oasis—five hundred eggs, fifty pounds of dates in petrol tins, several hundred oranges from Dakhla and a crate or so of live chickens. The House of Renault arrived late in the evening, the three cars occupying the only flat trucks the railway possessed.

At last we ¹ were away, Leblanc driving the first car, a charabanc with most of the party seated in rows like trippers on a holiday. I, as navigator, sat beside him. The course led west at first, along the regular Dakhla car track, through deep sand and dunes for the first fifteen miles, with the distant cliffs rising in a long line on the right.

Clear of the oasis, on ground too far above the level of the artesian water for the roots of any plant to reach it, we passed again into the world of rocks and sand. The absence of life was even more complete than it had been on the Siwa journey. There

¹ The whole party consisted of N. D. Simpson, botanist; F. Shaw and Mistakowi Effendi, entomologists, all from the Egyptian Ministry of Agriculture; M. Leblanc with drivers, mechanics and cook, of the Firm of Renault; Flying Officer Thomas, Royal Air Force; and myself.

was now not an insect jumping in the sand, nor a fly. Once accustomed, though, to this absence of life, one begins to take a keen interest in other things—in the appearance of the rocks, the outlines of the cliffs and hills, the changing colour of the country and the texture of the sand.

It was all new here, like nothing I had seen before. For beneath this southernmost front of cliffs—of limestone like all the northern country—there now spread out the exposed surface of the older Nubian Sandstone. The general effect was one of red and black hills and rocks in a setting of deep gold sand, in contrast to the limestone country where white and grey cliffs vary the monotony of brown flints lying on a floor of pale yellow. The whole tone was richer and deeper. Here there were no pebbles on the ground, but pools of gold sand separated by large black flakes and plates of stone or outcrops of layered red rock.

This was another Egypt whose existence the army away in Cairo had never thought of. The maps we had used covered only the northern half of the country. This had been beyond our horizon, a blankness off the map, too far away, to which we should never go, part of the great dim desert where only the accomplished experts such as Prince Kemal el Din, Dr. Ball and Mr. Beadnell could penetrate with Government backing and great resources.

I had met Dr. Ball for the first time a few days before with Simpson, to talk about our route. Egypt grew twice as large at that meeting. Maps were pulled out that I had never seen, maps of Southern Egypt with the routes of previous travellers and of the early parts of his journey with the Prince, the history of which I was very vague about, for it had not been published in English nor had his maps been on sale to the public.

I wish now I had made Dr. Ball's acquaintance

earlier. It is largely due to his enthusiasm, help and advice that our subsequent journeys were possible. Geologist, engineer, surveyor and explorer, he is the father of all modern investigations of the Libyan Desert, having begun his travels by camel forty years ago. During the war he continued them by car, accompanying the Light Car Patrols on the most daring of their excursions far beyond the limits of previous knowledge.

Here on the actual ground there were the narrow tracks of Prince Kemal el Din's caterpillars, three years old, running faintly off towards Terfawi for the start of his long journey to French Equatoria. We followed them till they disappeared in a patch of blown sand, then presently picked up the broader and fresher tyre tracks of Beadnell, who used Renaults like our own.

The six-wheelers glided like ships over the flat sand. They were much slower than our touring Fords, but the charabanc, being less heavily loaded than the other cars, made better speed. We would go ahead for an hour or so and wait for them. Their sound behind could be heard ten miles away, long before the cars themselves were visible, so loudly that even the noise of each gear-change could be distinguished. Then as they came nearer the sound died away to nothing, till we heard it normally again when the cars were close. It is a curious sound effect, like hearing through a telescope! I have heard the same thing in some parts of Sinai but not nearly so pronounced.

We passed the second night under a small solitary hill 150 miles from Kharga. The utter sterility of the country had been brought home vividly during the last two days. At the start one of the car-drivers, while holding up a heavy four-gallon tin of petrol to fill his car, had slipped, falling through

the wind-screen and cutting himself deeply in the back and arms. Simpson stitched him up as best he could, but we all thought it would mean returning for medical attention. In forty-eight hours, however, everything had healed up without sign of infection. It seemed that not even a germ lived here.

It was cold that evening. The north wind blew gently but steadily over the country. We had just finished dinner and sat restfully about before turning in, thankful to Leblanc for the excellence of his cook, when Thomas of the Royal Air Force, who was with the party to report on possible landing grounds, caught the sound of something moving rhythmically across the sand. We all heard it, and I must confess to a momentary creepy feeling down the back—it was uncanny that anything could possibly be moving about. The whole world was dead. Yet something was passing us, away out in the darkness, with a slow regular rustling. We all went out towards it together. Something, the size of a small dog, was moving forward jerkily, pausing and moving on again in a preoccupied way. Then Simpson the botanist ran forward and picked it up. It was a dried-up tumbleweed, a little spherical bush that grew, he said, in the neighbourhood of Siwa 500 miles up wind. Breaking loose at its appointed time, it had been rolling on and on with the wind, vainly shedding seeds that would never germinate. We replaced it on the ground. Immediately it was off again on its hopeless journey, rolling steadily onwards into the Sudan perhaps for another thousand miles.

After leaving camp next day there was nothing at all to be seen, except at intervals a range of unknown hills far away to the west. The rock outcrops dwindled to mere patches of loose flake and then ceased altogether. Only a boundless sand-sheet

remained, whose tiny ripples glided by without any perceptible vibration of the car. As the surface warmed up, a mirage, hovering in the distance, approached to within less than half a mile, to surround us on every side like a vast sheet of steaming water. We were flies crawling across the upper surface of an almost submerged ball revolving slowly in a round pool. During all the midday hours there was no land in sight, not even a horizon, for the mirage curled up into the sky—nothing but the sun and the blue disc above, and the sandy disc below, the two separated by a close wall of dazzling shimmer. We would stop to wait for the other cars humming invisibly behind. Presently a sea-beast would break through the surface of the mirage, elongate quickly to a factory chimney, and as quickly shrink to a motor-car as it reached the shore of reality.

We should be nearing Bir Terfawi now. Distances were rather difficult to determine accurately, owing to the speedometers having been wrongly geared in the hustle of starting out from Cairo. The reading had to be halved, an undetermined fraction between eight and twelve per cent. added, and the answer was in kilometres. At last something showed up ahead. Dark distorted mounds broke through the mirage first as oval blobs floating in the sky, whose bases slowly grew till they touched the ground. The sand dipped suddenly into a hollow a few hundred yards long, peopled with blue-green tamarisk forced up by accumulated sand into tall cones called "terabil" twenty feet in height.

Leaving Leblanc to wait for the other cars, we made our way down into the hollow. There were camels there and men—four Ababdi boys left by Beadnell as a relay post while he was away beyond. He had not been heard of for some time. We

asked them about the locusts. "They had gone away," they said. "How long ago?" They didn't know. "In what direction?" They shrugged their shoulders. "With the wind." "Where was Mr. Beadnell?" Again we drew blank. He had evidently gone away "with the wind" too.

We looked about. In the centre of the hollow, sheltered by a group of tamarisk, stood a few unkempt date palms. Beneath them lay the water-hole that the prince had scraped out and lined with petrol cases four years ago. A few yards off were the shrivelled carcasses of one or two of his camels. The palms had been badly eaten by locusts recently, and near by, in a patch of grass, were the skins of the young hoppers that had flown away.

We had come too late, but the naturalists were to explore the place all the same. No one had botanised or bug-hunted before between Kharga and the Sudan frontier. One of the entomologists wandered off and in a few seconds produced a large locust as might a conjuror from a hat. Simpson held a council of war. The swarm had been here, and we must search the few other tamarisk clumps known to exist in the area for the lumps of white froth which would betray the eggs if any laying had been done. They were also anxious to collect all possible insect and plant life of the terabil country.

We had forgotten about the cars behind. An hour had passed and now not even Leblanc was to be seen. We scrambled up the loose sand to the top of a tamarisk cone and waited in the hot sun. The eldest Ababda came up carrying Leblanc's smart new wash-basin which had adorned the bonnet of our charabanc unused during the last few days of waterless travel. He had the important air of one who has found the last relic of a lost comrade. It looked as if the other cars too had

gone away with the wind; we pictured them lost outside somewhere in that wretched blind mirage. All our food was with them. However, after another half-hour the familiar humming could be heard. The last car had merely broken a back axle and Leblanc had gone back to help.

The naturalists having presently "done" Terfawi, we embarked next day upon a cruise round the neighbourhood, beginning with the west, where the prince's old tracks led off towards 'Uweinat, 250 miles away. The empty tins he had left to mark his route for his camel convoys to follow with his supplies ran on in an unending line across the sand. Ten miles on other groups of tamarisk cones appeared, the last outpost of vegetation in the west. Beyond that the surface rose too high above the underground water level for anything to live, and neither the prince nor Beadnell had found any vestige of life between here and 'Uweinat.

These lone groups of cones, rising as high as fifty feet out of the flat sand-sheet around, their slopes blackened with dead sticks of the struggling tamarisk plant within, huddled close together as if for defence against the pitiless tide of sand, produce a queer sense of isolation. Looking from their summits, from horizon to horizon, not a stone is visible to break the smooth face of the sand. Seen from a distance, the few branches of living tamarisk at the tops appear to stream away to leeward of the wind as smoke from a group of black volcanic cones.

Amongst this group lay a single patch of stones left unsubmerged by the sand. Each stone was a fashioned tool, a knife or chisel, with a thin serrated edge. The place must have been a Stone Age settlement long ago before the sand arrived. Caught up amongst the tamarisk branches were the wings of dead locusts, but they might have come an untold distance like the tumbleweed.

Prince Kemal el Din had reported seeing more terabil to the southward, so we struck out in that direction to investigate, but there was nothing, for this was the northern edge, as we found a few years later, of the great Selima sand-sheet which covers an area of at least 20,000 square miles. It was midday, and once more the sky closed in upon us, reducing our world to a tiny circle of sand. At last, after a long detour, we set a course back to the bushes of Terfawi, which I cheered to see loom up just where the plot of our course showed they should come. I am always touched with astonishment when I hit off a certain latitude and longitude on the actual ground merely from a piece of paper, a protractor and figures giving the sun's position calculated from a formula. It gives a satisfying sense of correspondence between reality and mathematics.

It was very cold again that night, the thermometer falling to within a degree of freezing. The Ababdi brought quantities of dried tamarisk—the green living plant is full of sticky salt and burns badly—and made a comfortable fire. They spent the evening with us, shyly watching from behind the flames.

From time immemorial this tribe has provided guides for caravans between the Nile and the Red Sea, and probably in this portion of the western desert too, in old times when the traffic along the great slave road, the Darb el Arba'in, provided a little caravan business even as far west as Bir Terfawi; but for years now, since the last slave caravan passed by, the whole country has been abandoned to foxes and gazelle. It is doubtful if any of these lads had ever been to the west before. They were useful to Beadnell, for they could follow after his car tracks with supply camels.

Experience has shown that native guides, even

though they know the country and can find their own way with camels, are most unreliable when asked to guide a car. It is natural enough. Without long practice and an understanding of the speedometer they can have no idea of distance in a car, accustomed as they are to reckoning all distances by the time of a camel's movement from one recognised place to the next. In a car they are many miles past a landmark before they think of looking for it. Yet it is curious how long the old idea of the guide's omniscience takes to die out. Case after case has occurred of car parties leaving the knowledge of their whereabouts to a guide, and getting lost. Even the prince, with the most famous living guide of the area, was taken miles out of his way by the man in his efforts to find Terfawi. One must decide on one method or the other; if the guide be relied upon entirely one is relieved of much trouble, but if he gets lost, one is lost with him. On the other hand, if one keeps a check, by compass, on the route taken, there is little object in having a guide. In other countries where obvious landmarks exist, such as valleys and hills, a guide is invaluable to point out the best route, but directly the land surface becomes featureless, and the problem is to hit off some known location, it is wise to trust one's own scientific methods, however crude, at the very start, rather than the guide's memory. This is not to imply, though, that a native cannot adapt himself to the speed of car travel. The evidence is that he can do so remarkably well with sufficient experience, as P. A. Clayton has found. But it is courting trouble to trust a camel guide, however good, if he is not trained to cars.

Next morning heavy clouds came over and it rained; an incident to be recorded in the annals of the country. No one can say how often this happens

in any one place, whether on the average every ten or hundred years, for no one is there to observe; certainly far too seldom to sustain any vegetation not rooted in the foreign-coming artesian water underground.

By the following afternoon we are hurrying south-east towards Shebb, travelling again by dead-reckoning with compass and speedometer, and by dusk succeeded in hitting off the small area of reedy grass which surrounds the water-hole of Saf Saf. We had not gone far next day when the tops of new uncharted terabil broke the horizon to the south. We changed course to have a look at them. From them others were visible ten miles on, a succession of dark pimply eruptions far apart on the pale face of the sand-sheet. We drifted throughout the morning from group to group, keeping stock of our position by a rough triangulation. Everywhere there were locusts, few, scattered and impossible to deal with.

By midday the country became more broken. Low cliffs appeared and small hills. We made Bir Kereim in the early afternoon, a basin of white sand half a mile wide with scattered clumps of spiky grass and tamarisk. Gazelle tracks crossed and recrossed in the sand between groups of tall untidy dom palms, whose stems were draped to the ground in dead uncut leaves. The old water-hole was half filled with sand. The shrivelled body of a camel sprawled head-first over the edge, dead years ago of thirst unquenched.

An hour later the blockhouse on the old Arba'in slave road hove into sight, perched on a low cone of black rock. The well lay in a perfect little camping ground below, shaded by a clump of palms and sheltered from the wind by a steep encircling sand dune. A ragged palm had fallen across the well, but in its shade the water was plentiful and

cool. Simpson discovered in its depths some rare water-weed.

The naturalists did serious work that evening; the contents of killing-bottles were sorted out and Simpson sat down in earnest on a petrol case with plant press, labels and notebook. The House of Renault was busy too, with grease and small repairs under the watchful eye of Leblanc. One of the cars was found to have a loose big-end which meant a day's work on the morrow. Thomas and I wandered off to explore.

The old blockhouse was intact, a square of stone, doorless and windowless. The wooden ladder still leant against the outside wall just as it did in the far-off days of the Mahdi and his khalifa Abdullahi, during the fifteen years after Gordon's death in Khartoum, when Shebb and Wadi Halfa were the frontiers against the Dervish Empire, and Slatin was a prisoner in chains in Omdurman. These wells were used then. All this neighbourhood was active with patrols, both British and Dervish. The slave trade along the Arba'in had only just been interrupted by the Dervish war.

Now all west of the Nile is utterly deserted; the sand has flowed over everything, untrodden like dust on the floors of an empty mansion. Here was the same queer pause of time as at Petra, between the present day and former times. Fifty years or two thousand in the desert are much the same. Here is a frail wooden ladder still new, unrotted and undisturbed by man; there a temple façade, fresh as when it was carved.

From the walls we could just distinguish the wobbling half-obliterated camel grooves of the old slave road reaching like drawn finger-marks away into the distance. In the setting sun the dark flat-topped hills cast long shadows across the sand, which turned from pink to murky grey. The place

started one's imagination. Only sixty years ago great caravans were plodding up those grooves from the South, from the collecting centres in Darfur, with perhaps a thousand negro slaves to be sold in Cairo or shipped to Arabia—taken from the rainy green of their forests and driven in chains across barren sands for 1100 miles, seeing green palms and water with luck every third or fourth day only. One could picture them here huddled in groups outside, while Arabs crowded round the alum-tasting well, and passed restlessly over the arms of the encircling dune. Shebb seemed an eerie place that night. Sheltered by the dune the air hung motionless, but the dom palms up above, shaken by a breeze, whispered and rustled together as if talking over old times. Occasionally a small sand avalanche glided silently down the dune side.

After dinner we discussed plans. Some scattered palms and terabil still remained to be examined round Shebb, and odd terabil along the road as far as Kassaba which we could take on the return journey. Otherwise there was no further vegetation in the country except for three indefinitely located water-holes some sixty miles to the east which had not been visited for many years. Simpson decided to try and find them next day with two cars, while the third was being repaired, and while one of the entomologists remained behind to collect the insects of Shebb.

Noon next day found us in possession of Bir Nakhlai, its two deserted blockhouses, with one half-choked palm and buried well. The palm had been eaten recently as if a flying locust swarm had snatched a few mouthfuls in passing. We found the place without much difficulty after a diversion to the south following an old camel track to the site of the previously uncertain Bir Hassab-el-Gabu, of which all that now remained were a dead palm and white

rounded mounds of blown sand, the shape of little bushes smothered under snow. All this country has been drowned in sand comparatively recently. We turned back towards Shebb.

The cars ploughed deep into loose fine sand. A cross-wind blowing from the north caught up our dust and curled it back over us in a cloud that trickled down our necks, got into our eyes and filled our new-grown beards. We became brown from head to foot. Dust fell like rain on the navigator's plotting board and ran off in brown streams. Leblanc wept as he drove. The wind increased. Long tongues of driving sand began to glide over the surface of the ground, pursuing one another like pale flames. Behind us the tyre tracks filled up and faded out a few hundred yards away.

It was a dishevelled and tired party that at last dropped over the crest into the sheltering dune of Shebb. Above, the sand raced along the dune with the noise of escaping steam and the palms shouted overhead, but down below, as with most crescent dunes, there was complete calm.

Having searched the whole desert, as far as known vegetation was concerned, the object of the expedition was now at an end. The swarm of locusts we had been following had probably gone south into the Sudan, out of Egyptian jurisdiction. If they had reached the Nile the fact would be reported and dealt with by others.

Next morning, therefore, we started off on the return journey direct to Kharga along the old Darb, which was said to be well marked all the way. Presently the low cliffs fell away, and the old camel ruts, clear-cut in the shingle and rough country, disappeared in a plain of sand, so that we set a compass course and drove some way before realising the manner in which the route was really marked. Camel skeletons drifted by. More showed up ahead

so starchy white that the sand around seemed turned a deeper gold. The plain widened, and skeletons lay scattered as far as one could see to right and left; little white islands raised above the sand. After Bir Kassaba, the last sight of plants before reaching Kharga, the bones led us up a defile to a rocky country of higher level. They were close together here, a solid avenue. Skeletons sprawled over the rocks just as they had fallen, fifty—a hundred—years ago. At times it was difficult to drive through clusters of forty or more strewn in a narrow place.

Now and then we passed a twelve-foot pyramid of smaller bones heaped round a rock, the eyrie of some long-lived king of carrion birds. But mostly the bodies seemed to have been left alone; skin and shrunk flesh lay intact underneath the sand. Few birds could live so far from water. We drove steadily on for two days. North of Bir Murr, a desolate barren place with foul green water in a tiny pit where we stopped a night, we cruised for a hundred miles across great sand-sheets, as in our outward journey farther west. Always the skeletons glided past. Look where one would, there was no limit to this cemetery. The white heaps reached miles away on either hand to the horizon. The farther one drifted to a flank, the fewer bones per mile, but always there were bones beyond. Sometimes a row of ribs, caught in the mirage edge, would loom up momentarily enormous like the battered framework of a wreck.

At last we sighted the long line of cliffs overlooking the southern end of Kharga and from here a rather difficult day's run up the sandy length of the great hundred-mile depression brought us once more to Kharga town, past scattered villages half choked with sand, past dunes and salt-marsh, hot springs and fruit gardens. At Kharga the party

broke up. Simpson went with the Renaults on a successful attempt to reach the Nile by car up the cliffs, partly to save time and expense, but principally because Leblanc had been told the cliffs and the surface of the plateau above were both impossible for cars. The rest of us, in a hurry to get back, returned comfortably by train to Cairo. Forty-eight hours after leaving Kharga Oasis I was in Baghdad on my way to India. Egypt was left behind as I thought for good and all.

That same winter of 1927-28, two months earlier and unbeknown to us, another party consisting of Messrs. D. Newbold and W. B. K. Shaw, on leave from the Sudan Government Service, had also disturbed the slumber of the Arba'in Road, meeting it at Selima and Bir Natrun Oasis far to the south, in the course of a daring camel journey of a thousand miles through unknown country.

Stirred just as we were by the sight of this legendary road and by the thoughts of the past it conjured up, Shaw afterwards went to some pains to collect what remains of its history and an interesting article appeared by him in *Sudan Notes and Records* of 1929. But of the great caravans themselves, their life and organisation and of treatment of the slaves they drove, practically no picture is left. For it was essentially an illicit trade, in the hands of the bedouin, who kept to the desert in order to avoid the extortionate "squeeze" of the civilised officials of the Nile Valley, and little or nothing is likely to have been put on paper.

And in the years following the chaos of the Dervish period from 1883 to 1898 everyone was far too busy restoring order and authority in the Sudan to think of collecting first-hand stories from the old men who had driven slaves before the Mahdi rose. Probably most of them had died during the Dervish

wars or had been killed at the battle of Omdurman. Now no one can be found alive who remembers the old trade along the Arba'in.

The Arba'in was the easternmost of four ancient routes by which trade flowed across the north desert between the civilised northern coast and the tropical south.

The southern rendezvous from which the caravans set out was the now waterless and deserted town of Kobbé, 35 miles north-west of El Fasher and the former capital of the kingdom of Darfur. From here the Road ran north-east for 330 miles to Bir Natrun Oasis. So much of the history of the Road had been lost that the very track of this southern stretch is uncertain, but for the last 250 miles before the Oasis can be reached, no permanent wells now exist, and desert conditions rapidly set in as one goes north, all vegetation finally disappearing some 200 miles out of Kobbé.

Beyond Bir Natrun is a waterless and entirely barren stretch of 160 miles mostly over open sand to a second oasis, Lagia el Arba'in, where water can be got, but practically no green stuff for the camels. From here Selima Oasis is reached after a rocky journey of 140 miles. The next well is Shebb, about 80 miles beyond, which is followed by a chain of three water-holes, Bir Kassaba, Bir Abu Hussein and Bir Murr, less than a day's march apart, till by a final stretch of 90 miles Max, the southernmost village of Kharga Oasis, is reached.

From here onwards, at any rate during the nineteenth century, the caravans came under the control of the Egyptian Government. The present omdah of Kharga City remembers as a child accompanying his father, who held the same post before him, down to Max to assess the taxable value of the slaves and other goods of a caravan that had just arrived.

There is an old record that as the caravan approached Kharga, those in charge used to put the small boy slaves into large empty water-skins to try and smuggle them through untaxed. So the revenue people used to go along the length of the caravan beating the water-skins with clubs and listening for a yell from inside.

Kharga City lies another 70 miles farther north, after which follows a final barren stretch of 130 miles to the Nile at Asyut.

Thus the total length of the Road from Kobbé to Asyut was about 1082 miles, and from the name "Darb el Arba'in," or "Forty-day Road," the distance appears to have been divided into 40 normal daily marches, stages of 27 miles. It is quite certain, however, that a much longer time than 40 days must have been taken over the journey, and that 40 days refers only to the actual marching time.

From the almost total lack of grazing obtainable on the southern portion of more than 800 miles between the Sudan and Kharga, and the long distances between wells, it seems very doubtful if this part of the Road was in being before the introduction of the camel into Africa some time after the Persian invasion in the sixth century B.C. But that there was a desert traffic south of Kharga during the Persian occupation of Egypt is suggested by the ruins of a Persian outpost in the desert 50 miles south of Max on the line of the existing Arba'in track.

Shaw finds that on the old maps, up to the end of the seventeenth century at any rate, the difficult southern portion from Selima to Bir Natrun and Darfur is not shown, but that the Road left the Nile at the 3rd Cataract and, running through Selima and Kharga, returned to the Nile again at Asyut. Possibly, therefore, the lack of definition of the

long southern portion is accounted for by its comparative newness.

The first and still the only European to pass along the whole length of the Arba'in was W. G. Browne, who travelled southwards from Cairo to Darfur in 1793 with a caravan carrying, as he reports:

“Amber beads; tin in small bars; coral beads; cornelian ditto; false cornelian ditto; beads of Venice; agate; rings, silver and brass for the ankles and wrists; carpets, small; blue cotton cloths of Egyptian fabric; white cotton ditto; Indian muslins and cottons; blue and white cloths of Egypt called Melayes; sword-blades, straight (German) from Kahira; small looking-glasses; copper face-pieces or defensive armour for the horses' heads; fire-arms; kohhel for the eyes; coffee; silk, unwrought; wire, brass and iron; small red caps of Barbary; light French cloths made into Benishes; silks of Scio; silk and cotton pieces of Aleppo; shoes of red leather; black pepper; writing-paper; soap of Syria. . . .”

He returned in 1796 with the annual slave caravan, whose value he put at £115,000. It consisted of 500 camels, though apparently caravans of 2000 camels and 500 slaves were known. It brought with it:

“Slaves, male and female; camels; ivory; horns of the rhinoceros; teeth of the hippopotamus; ostrich feathers; gum; pimento; tamarinds made into round cakes; peroquets in abundance, and some monkeys and Guinea fowl; copper, white, in small quantity.”

Napoleon, in a letter from Egypt to the Sultan of Darfur, sent his greetings and asked that the next caravan might bring up 2000 black slaves upwards of sixteen years old, strong and vigorous.

To maintain so great a host of men over the southern stretch of 800 miles from Kobbé to

Kharga must have needed a vast amount of organisation, and the pity is that no details are left to us of how it was done. Food for the whole journey of more than a month had to be carried for both men and animals, while the provision of drinking water for the men during the longest waterless stage of ten days' marching would alone be no mean undertaking. It is difficult to picture the staff of any European army with or without motor transport arranging to-day to march 2000 men along the Arba'in.

Whatever may have been the relative importance of slaves in the total trade along the Road in old days, it is certain that under the corruption of Turko-Egyptian rule in the nineteenth century the slave item grew to huge proportions, and that without it the remaining trade would never have survived. On the rise of the Dervish Empire after 1884 both the Nile and the Arba'in routes were closed by British and Egyptian military posts at Wadi Halfa and Shebb, so that all traffic ceased. When peace was at last restored after the Battle of Omdurman, and the new Sudan rose from the ashes of the old, the Arba'in caravans, shorn of their slaves, were no longer profitable. The old Road was forgotten, and now nothing remains but the rows of cairns along the way, the old worn grooves, hundreds abreast, and the skeletons of the million camels that made them.

CHAPTER VI

'AIN DALLA: FAILURE AND DISCOVERY

IN India I spent nine months at Jubbulpore. Egypt faded out of mind in the effort to absorb the new mode of life and the new surroundings. Then, in November 1928, came a move to Waziristan on the North-West Frontier. Camels again, the same dry barren country as in Egypt, and drift sand heaped about the Indus Valley. But there was this difference; everywhere that political dictates allow one to go, the country is populated, known and mapped. Even to the west, away in the mountains, Englishmen have travelled about for seventy years or more.

I began, little by little, as even the fantastic mountain scenery of the Frontier became familiar, to miss what Egypt alone could give, the knowledge that the unknown lay at one's very door, that it was within one's power at any time to step right off the map.

In the still vivid light of that last expedition to Bir Terfawi I read and re-read both Dr. Ball's now classical paper on the *Problems of the Libyan Desert* and Hassanein Bey's *Lost Oasis* describing his discovery of 'Uweinat. There were still enormous areas the size of European countries which no one knew anything about. The idea began to crystallise that our car parties, with the experience we had gained, might do some exploration on our own.

It was a question primarily of transport. We had neither the organisation nor the financial resources with which to send dumps of petrol out beforehand

into the west. If we did anything it must be with supplies carried with us from the Nile; and that meant that on our previous reckoning we would be limited to a journey of 1000 or 1100 miles.

But a new factor had now been introduced by the appearance of the New Ford. There had been delays, but recently a few touring cars and 30-cwt. lorries had arrived in India. I examined them carefully. The engine was more powerful, which was all to the good, and, essential points, the transverse springing, etc., which had made the old model so successful across-country had been retained. The touring chassis was much the same size and I did not think that a much greater total range of action could be got out of it. But the lorry was a new idea. It did about 19 miles to the gallon on Indian roads, and on previous experience with cars, this meant somewhere about 12 to 14 miles per gallon in the desert. With a full load of petrol, therefore, it looked as if we could increase our self-contained range to over 2000 miles.

There was no question in my mind of trying any other make of car. There was nothing else as good, whether in the materials used and therefore in reliability, or in design or accessibility and ease of repair. If a car was found of slightly better theoretical performance, the practical improvement would be far outweighed by the fact that we knew the Ford so well. Moreover, the New Ford had already been tried in Egypt by the Desert Survey people and found to be very good indeed.

I say in "our" hands, but here was the difficulty. Who was there left who could be collected into a suitable party? Of all those with experience of our previous doings only four remained in Egypt, including Craig and Prendergast. Both Holland and Bader had already gone home at the end of their period of foreign service.

However, I discovered that all the four who remained were keen to join an expedition. But there was trouble about their getting leave to go, for, owing to the heat of summer, any desert expedition would have to be done in the winter months, just when the army was getting busy with its annual training. Personally I could probably get away, for that year there was peace from one end of the Indian Frontier to the other, though such a condition was unlikely to last. In such an inhospitable country as Waziristan, too, the authorities were sympathetic towards leave, as long as everything was ready in case of trouble.

It all depended on whether the four folk in Egypt could get away. The situation was delicate. Such things are difficult to negotiate by letter when one is in another continent. But Fortune intervened again. Imperial Airways opened up their line to India in April 1929 and I booked a passage to Egypt immediately; I was their second passenger along that route. Within three days I was in Cairo, and finally, with welcome help from influential quarters, Pharaoh's heart was so far softened that he let his people go—for a month!

I was also able to fix up the general scheme of operations on the spot before flying back to India. The nearest and most attractive of the unknown areas of the Libyan Desert was the strip some 300 miles wide bounded on the east by the chain of Egyptian oases, Siwa 'Ain Dalla, Bir Abu Mungar and Dakhla, and on the west by Hassanein's north to south route through Kufra.

It was then almost impossible to approach this area from the north owing to the exclusive attitude of the independent Senussi government at Kufra, and their war with the Italians along the Libyan coast. An expedition from the south meant a

base at 'Uweinat with an expensive dump of petrol there (and to reach 'Uweinat alone required a fairly ambitious expedition). From the east all previous attempts at exploration had been checked by range behind range of mighty sand dunes some over three hundred feet high.

The eastern edge of this sand barrier had been patrolled from a distance by several explorers in the last sixty years, but all of them had reported a continuous uncrossable wall of sand. Only one expedition, that of Rohlfs in 1874, had ever managed to penetrate any distance into the sand from the east, but the dunes became so formidable as he advanced westward that his expedition—a very strong one fitted out regardless of expense and backed by the Khedive of Egypt—was forced to turn north and to run for Siwa, 300 miles away, along the valleys between the parallel dunes.

As to the thickness of this sand barrier from east to west no man could say. Rohlfs called it the Great Sand Sea. Curiously enough no exact information had been given by any traveller as to the true make-up of the dunes; in particular no one had stated definitely from close observation that the dune ranges really were unbroken. Even Rohlfs' diary was vague on this point. The question was discussed with Dr. Ball, who, while not holding out much hope, agreed that there was just a possibility that the ranges might be limited in length and echeloned so as to give only the appearance of continuity.

Our scheme was to make 'Ain Dalla our base, and to investigate the actual dune edge to see whether by chance a tortuous way might not be found through them to the unknown west. The general opinion, shared even by Prince Kemal el Din, who had done more exploration by motor-car

than anyone else living, was that it was quite out of the question for cars to penetrate the Sand Sea, let alone to cross the actual dunes. We never doubted this for a moment, but merely hoped there might be a sandless way through. If not, we would run south along the known edge of the sand country to Dakhla and thence to the Nile at Aswan or Wadi Halfa.

Our transport was to consist of two 30-cwt. lorries, of which I would buy one, and Prendergast and Craig the other, and a New Ford touring car which Giblin owned and would bring with him. In order to gain enough experience of the performance and weaknesses of the new lorries before we started, I decided to buy mine in India and drive it across to Cairo during October 1929, in time to start for the west at the beginning of November, when the weather would be reasonably cool.

The lorry chassis was bought at Rawalpindi that summer, and a light wood body built to my design with plenty of lockers and handy places in it to stow away odds and ends.

We set out at the end of September with all our baggage on board. There were three of us, all from Waziristan; Lieut. D. W. Burridge, Royal Signals, the sixth member of our party for Egypt, Capt. W. C. V. Galway, M.C., Royal Signals, who was coming as far as the Mediterranean with us on his way to England, and myself.

The start was not encouraging. At the last moment an urgent but mistaken message came saying that the Persian Government were stopping everybody from India at the frontier unless they could show a certificate that they had been inoculated for plague, smallpox and cholera within the last ten days. Fearful of being held up, we

hurriedly had all three inoculations done on the same day, with rather depressing results. Then the bursting of the Shyok glacier dam away up the Indus upset our plans, for the river rose and washed away the only road from Waziristan to Quetta, so we had to rail the lorry to Sibi across the Indus, and thence drove on up the Bolan Pass to Quetta.

A railway runs from Quetta for 400 miles westward to the Persian frontier at Duzdap, skirting the southern edge of Afghanistan. All arrangements had been made to rail the lorry over this bit, for we had been warned that there was no road across Baluchistan fit for us. But by bad luck I met a Political Officer who scoffed at the idea of the train. "It's terribly uncomfortable," he said, "and you'll be at Duzdap as quickly if you go by road. It's quite good now, I've just made it up." Never trust a man who says he has just made a desert road! We took five days to get to Duzdap frenziedly pushing that lorry. There was no road; what little hard crust there had been was destroyed by the enthusiastic road-builder, leaving nothing but bottomless pebbles lubricated with dust, into which our back wheels sank miserably. During one day, 200 miles from either end, we did only thirty miles. Nothing can be more hopeless than one lorry stuck by itself with insufficient hands to push. There were but three of us, two to push and one inside to coax the labouring engine. The country was uninhabited and the temperature over 100 degrees. There were not even any rocks or other materials to put underneath the wheels. In the middle of it all we saw the train sail by.

But once in Persia all went well. We bowled along the old caravan road northwards to Meshed, driving far into the night to make up for lost time.

The swamps of Seistan lay on the right. White camel skeletons loomed up by the roadside in the light of the headlamps, and now and then a shiny petrol tin, emptied by a lorry and thrown away. At intervals a lorry full of skins lay asleep in the middle of the track without lights. It is the fashion to drive at night in Persia. They say that it saves the tyres because the rocks are cooler.

We did the 600 miles to Meshed in just over two days. Villages and towns bumped by a hundred miles apart separated by high mountain passes where the air grew cool—brown barren mountains with bouldery foot-slopes under a cloudless deep blue Persian sky, little bright green villages with flowing water brought in tunnels underground from the mountains, windmills like paddle-wheels with their shafts stuck upright rotating horizontally; everywhere a friendship of the road as one imagined existed in the old coaching days at home. In the towns each garage is *ipso facto* an inn.

In this huge country 2000 miles by road from end to end, with no railways and with cheap petrol, the car is the only means of travel, as, in former days, was the old coach in Europe. The traveller enters his car and get out three days later at his destination. The poorer folk use buses. We passed many, mostly Chevrolets packed with people, clattering at high speed over the rocky road.

Broken spring leaves lie about, but a halt of a day or so for repairs is merely an incident of travel. The driver is his own mechanic. If a vital part is wanted the party wait. In half a day with luck another car comes by; the driver gets a lift into the nearest town, maybe 200 miles away, where an agent keeps a store. He collects what he wants, turns up on another casual car or lorry a day or so later and settles down in the sand and stones to do

his repair. Meanwhile the passengers camp happily where they can. One is expected, apparently, to give a lift, when asked, to anybody who wants it. We nearly always had a few on board—mostly soldiers.

From Meshed westwards the country is more civilised, towns more frequent and a good metalled road carries big fast American lorries laden with four to six tons of goods.

We had got used to being stopped in every town to have our passports examined. On the East Persian Road we were able to explain ourselves in Hindustani interpreted by stray Indian merchants, but now, unless happening upon a high police official who spoke French, there was more difficulty. They wanted some document we hadn't got though the consulates had armed us with a sheaf of papers, and at each town became more insistent. Then our number plate fell off. This eased the situation, for we became unusual enough to be waved on with a shrug of the shoulders. It was only at the very end, within a hundred miles of the Iraq frontier, that we discovered what was missing—we had no driving licence; and we had to pay.

Nishapur, Shahrud, Samnan went by; the Golden Road got better and better—a broad highway carrying much traffic of buses, cars and lorries. Another 600 miles brought us to Teheran over 9000-foot passes through the southern spurs of Demavend. Then on to Kasvin towards the Caspian, into a country of vineyards and really excellent wine; on again south-west through Hamadan and Kermanshah, past the cliff of Bisitun with its great rock inscription of Darius the First, over higher and higher mountain passes where the snow was beginning to lie—down at last to the

plains of Iraq across the frontier at Khanikin, and so to Baghdad and the luxury of a hotel.

When I was very young a big financier once asked me what I would like to do, and I said, "To travel." "Ah," he said, "it is very expensive; one must have a lot of money to do that." He was wrong. For there are two kinds of travellers; the Comfortable Voyager, round whom a cloud of voracious expenses hums all the time, and the man who shifts for himself and enjoys little discomforts as a change from life's routine. Both kinds may enjoy themselves equally, but the latter probably sees much more of the country and its people, and has the added pleasure of going where lack of comfort excludes the former.

The whole of that journey to Cairo cost us £37 each, including food for a month and petrol for 400 miles; far less than the steamship fare alone from India to Port Said without any of the inevitable extras. We drove and halted when we liked, fed and slept where we liked in the sand by the roadside, as the people did. Blankets and a cooking pot, making one independent of hotels, speed up the journey, cut down the cost to a mere fraction, adding, too, a wonderful sense of freedom that hotels and towns withhold. Perhaps it is really possible to camp out only in desert countries, but after all these cover a quarter of the world and contain most of its old worth-seeing wonders.

We had Sir Percy Sykes' *History of Persia* with us as a guide-book. It made one long to dally and to stray off the road to see things. If only we had not been so hurried for time, and could have talked a little Persian! Holland was still one up on me over this leisure, for before going home he had joined one of Leblanc's car-selling expeditions from Cairo to the East and had had time to trek through the

Caspian provinces and to go south to Shiraz and see the ruins of Persepolis.

We arrived in Jerusalem at the end of October, having come via Damascus, over the Lebanons to Beyrout and down the coast through Haifa. Equipped with a permit from Jarvis to cross Sinai, we managed to reach Cairo in a little over a day, along the road we had once thought so difficult. Many improvements had now been done, including a broad wire track right through the sand-belt.

Burridge and I had six days' rest in Cairo. There were surprisingly few preparations left to be done. The whole party¹ worked together very much like clockwork. Craig as usual arranged for all the food supplies—this time for a whole month. Prendergast's lorry was ready, with an efficient box-body thoroughly equipped with tools, spare parts, picks and shovels.

There was only one big innovation on the arrangements of previous trips; that was the inclusion of position-finding apparatus. We were now going, we hoped, into the unknown, beyond the last landmarks whose positions were fixed on the map by triangulation or astronomical observation, and felt it would be a pity to travel as several others had done before us without the means of accurately locating new geographical features on the map. Besides, I was nervous of relying entirely on a dead-reckoning compass course to tell us where we were amongst the dunes, for by dead-reckoning alone one can never recover from an error once made.

¹ Consisting of Captain V. F. Craig, M.C., Royal Engineers; Captain R. G. L. Giblin, Royal Signals; Lieut. G. L. Prendergast, Royal Tank Corps; Lieut. I. B. Fernie, Royal Tank Corps; Lieut. D. W. Burridge, Royal Signals; and myself.

We had to have the means of getting our position independently at any time. So Craig borrowed a theodolite to take latitude and local time by observing the altitudes of stars, and Giblin produced a short-wave wireless receiver to get Greenwich time, so that longitude could be found from local time. The receiver was packed in a padded box bolted to the running board of his car.

Both Dr. Ball and P. A. Clayton of the Desert Survey helped us a great deal. It was at the latter's suggestion that Giblin had a pair of rope ladders made up, with bamboo rungs lashed to light cords of stranded wire for laying in front of his car in soft sand in place of our usual rolls of wire netting. In the absence of other means Clayton had originated the idea of ladders in 1927 on a boundary commission with the Italians in the sand dunes west of Siwa.

For dealing with the lorries in soft sand we had nothing, for there was no real intention to attempt the crossing of any dunes. As an experiment I had made up in India a pair of detachable wheel-treads consisting of flat blocks of wood strung on wire ropes whose ends hooked together round the outsides of the lorry's back tyres. They were a failure, though, for they kept slipping off; but they had been some use in Baluchistan, where, with nothing else to hand, we had laid them out flat on the soft ground to support the wheels while we pushed. They made a sort of short roadway, but even then, having no hold on the ground, they were very apt to be shot out violently backwards, all crumpled up, by the spin of the back wheels. However, we took them along with us now, and in addition at the last moment Prendergast threw on board the two old steel channels we had collected three years before for crossing ditches in Sinai.

They might possibly be some use, and they were only an extra sixty pounds weight.

We had made the bad mistake of not trying the lorries out fully loaded with their ton and a half of petrol and stores over the actual country we were going to cross. The extra weight of the lorries broke through the thin desert crust which had always carried our old light cars so easily. We had to grind along on lowest gear, digging deep ruts in the powdery clay and gravel. Added to that a following breeze from the east prevented any draught from playing on the radiators as we moved. The water in the engines boiled continuously, and we had to keep stopping to let it cool down.

Every few miles one or other of the two lorries would get stuck in the soft ground, the back wheels sinking in and merely spinning round, digging themselves ever deeper as long as they were forced to turn. If it had not been for those old steel channels we must have given up after the first three days and gone back to Cairo. They were the salvation of the expedition. They provided an unfailing way of extricating a car or lorry which no amount of pushing could move.

The mode of operation was as follows. With our hands or with shovels sloping grooves were dug out between the front wheels and the back, reaching down to the lowest point of the back tyres sunk in the ground. In these grooves the channels were laid with their rearmost ends almost underneath the tyres. Then, when the clutch was let in, the back wheels at once began to grip firmly on the steel, on which they rolled forward easily up the slope. By the time the front ends of the channels were reached, the lorry had attained sufficient momentum to carry it on for some distance beyond.

The great thing was to keep the speed up once it started moving.

The whole procedure soon became a drill. Three would push behind while the remaining two waited one on each side to seize the half-buried channels as they emerged behind the struggling lorry, lift them up and run with them to overtake it as it went forward, and then throw them down in position just in front of the back wheels again, so that the lorry got a second forward impulse from them. It took great strength, agility and skill to do all that. Only Giblin and Burrige could do it properly. One or two of these efforts would generally take the offending lorry on to better ground, over which it would hurry on lest it should stick again, while Giblin in the touring car, which could usually start on ordinary desert under its own power, would stay behind to pick up the channels and any other members of the party who were left behind. It was all very tiring, but we did manage to get along. The daily mileage was somewhere about sixty or seventy miles.

To our dismay though, the continual running on bottom gear caused the two lorries to devour petrol at a rate we hadn't reckoned on. A gallon lasted for only five miles for each vehicle instead of fourteen as we had hoped.

Our slow progress, too, had upset all our plans about water. The idea had been to go direct to Dalla, where there was known to be water, by a three days' run—it was only 300 miles—and in order to carry as much petrol as possible we had cut down the amount of water on board to a mere six days' supply at four pints each a day. Now, it being unsafe to go on without more water, we were obliged, leaving one lorry with the majority of the others' loads at a hill which Dr. Ball had located

on the map on one of his old journeyings, to go off northwards 100 miles out of our way to Moghara Well.

Having filled all containers here we had plenty of water for a fortnight or more, so it was decided to cut straight across-country to the edge of the Sand Sea north of Dalla, leaving a visit to that well till later.

Things went better. So much petrol had been used up that the lorries were noticeably lighter. The country was mostly the usual undulating gravel and stones, with occasional white limestone hills and depressions surrounded by little cliffs. Ours was a new route; probably no one had ever seen these features before, and it was decidedly pleasing to be able to sketch them in across a wide blank space on the map.

But one can hardly say that any of this Egyptian country east of the sand-barrier was truly unknown, for several other travellers had crossed it in the last thirty years in various directions, had noted the main geological formation, and looked out from their camels' backs for conspicuous geographical features. A great uninhabited country, on the other hand, can never be really known, for the best that can be done is to cover it with a network of travellers' surveyed routes, each successive traveller choosing a track cutting across the open spaces left, so that as time goes on the mesh will get smaller and smaller. In the area we were in now few spots were more than sixty miles from the track of someone's travels in the past, but even sixty miles is a long way off when there is no vantage point to observe from.

The landscape was by no means monotonous. Now and then small narrow ranges of dunes reached down from the north. Once or twice a dried mud-

flat appeared in a hollow with actual living plants growing in it, a tamarisk bush or two that had miraculously seeded there and taken root many years back when the last rainstorm had filled the hollow and stored water underground.

We kept a dead-reckoning compass course all day, using it as the basis on which to sketch in the position of anything we saw. At the end of each day's run the trace of our course would reach a certain point between the empty grid lines of latitude and longitude on the map. Later on after dinner, when Craig had worked out his theodolite observations, the true position of the camp was known, and this latter would be taken as the starting-point on paper for the following day's run, the previous day's detail being left to be corrected afterwards. There was rarely any serious error, though, in the dead-reckoning course—not more than a mile or so.

This position-finding added a great deal to the work to be done in camp after a long day's driving and pushing, but after all it made the difference between a mere sightseeing trip and a journey which might be useful to others after us, for it ensured that what little there was to be recorded was put in its right place on the map. In several cases we were able to correct the positions of features which had been located by previous travellers in terms of camel days and hours on such and such a bearing after leaving somewhere or other, and translated by Dr. Ball into terms of latitude and longitude. Sometimes they were ten miles wrong, but rarely more, which shows how accurate well-interpreted camel distances really are, considering that they are gauged solely on a knowledge of a camel's average speed. The errors are seldom more than five per cent.

Craig did most of the astronomical work, taking the actual observations and doing the calculations afterwards, while Giblin, who was responsible for keeping Greenwich time, recorded the instant of each observation from his chronometers. Later on, after the rest of the party had gone to bed, Giblin had to sit up to take the time from France. Sometimes in the stillness we others, half asleep, could hear them too—inhuman signals from another world beating seconds slowly and monotonously.

Presently a change came over the surface of the land. The white rock was rotting away in the wind into deep pits and winding gorges, leaving crumbly ridges and towers. The whole landscape up above became a sea of white rounded summits as far as we could see. Down below, the cars wound along between the cliffs, in and out as in a maze, ploughing foot-deep grooves in the white floury dust, each car enveloped in its own ball of choking cloud which the following wind carried along.

Then the scenery changed again. We emerged once more on to open unbroken ground of hard grey rock spotted with pools of good firm sand. Ahead not far away, along the whole of the western horizon, lit up by an early morning sun, lay the golden wall of the dunes. Through field-glasses their regular rows of summits could be seen. There was nothing else. The earth was dead flat, and on nearer approach to the dunes they seemed in contrast to rise up in front as mountain ranges. By noon the outermost rampart of sand was reached, a straight line of summits running across our path. Regularly spaced crests towered up as if a giant wave were about to break.

Leaving the cars on hard ground at the foot we climbed the highest crest. The surface rose easily

at first at an angle of not more than one in three, but steepened suddenly after the first hundred feet to the maximum angle, that at which sand begins to collapse if disturbed. Rivers of sand started to descend with each new step, carrying one's feet downwards almost as fast as they were raised. The aneroid showed the range of dunes to be well over three hundred feet in height.

From the top the view was distinctly encouraging. The range was a single knife-edge ridge fifteen or twenty miles long but with a definite southern end. Farther west lay more flat rocky ground for several miles, then another parallel range of sand also limited in length, dwindling southwards to a pointed snout; beyond that lay another and another overlapping each other. It looked as if by winding up and down we might be able to work round these dunes, keeping on hard ground all the time. But it was difficult to tell; everything was on such a big scale, and the dunes, casting no shadow, seemed unreal, merging sometimes with the sky and sometimes with the ground.

Ten miles farther south the cars rounded our dune range without difficulty through a gap between it and another overlapping one. But things looked different down on the level ground; in the general dazzle little could be distinguished of what we had seen from up above. Soon another bank of yellow loomed up ahead continuous, smooth and featureless, an uncertain distance away. Should we attempt to cross it? There was no alternative unless we gave up altogether, and we were already through the outer rampart which others had looked at and deemed uncrossable.

I increased speed to forty miles an hour, feeling like a small boy on a horse about to take his first big fence. I saw Burridge holding on to the side

of the lorry grimly. Suddenly the light doubled in strength as if more suns had been switched on. A huge glaring wall of yellow shot up high into the sky a yard in front of us. The lorry tipped violently backwards—and we rose as in a lift, smoothly without vibration. We floated up and up on a yellow cloud. All the accustomed car movements had ceased; only the speedometer told us we were still moving fast. It was incredible. Instead of sticking deep in loose sand at the bottom as instinct and experience both foretold, we were now near the top a hundred feet above the ground. Then the skyline receded disclosing a smooth blank surface of some sort, nearly level. The glare was intense; one could distinguish nothing, but from the slow rolling movements of the lorry we must be going over a series of gentle undulations.

I cut off the engine and let the car come to rest gently to wait for the others. The sand was covered with little ripples that had flown by too fast to be seen while the car was on the move. Our wheel tracks behind were barely half an inch deep; they trailed out behind cleanly like a pair of railway lines. Yet the sand was quite soft; I ran my fingers through it easily, and there was no surface crust to support the wheels. It was just the special way the grains were packed.

I remembered then for the first time a chance remark of Clayton's while describing his boundary commission trip two years previously, about running along the tops of some dunes instead of between them because it was easier. Not understanding what he meant and thinking I had heard him wrong I had dismissed it without a thought.

This was like no dune we had seen before. It wasn't a dune at all. It had no steep collapsing breakers along its top, and was almost flat. We

drove for over a half mile across it before dropping over its westward decline on to solid ground once more. To the north and south this streak or whaleback of sand ran on quite straight as far as we could see, but some miles away the ordinary steep-sided crested dunes were growing on the broad top of it like a line of parasitic fungi upon a fallen tree-trunk.

Another strip of solid ground, this time only two miles wide, separated this sand from its neighbour farther west. The latter looked quite different, breaker-like as the first one we had met, an uncrossable chain of loose collapsing crests with no gap for many miles, till at length after running southwards along its foot the crests were found to shrink in size and to disappear for a space, disclosing the real bulk behind, another great whaleback similar to the one we had crossed.

We penetrated another fifteen miles into the dunes that day, working north or south along the ranges until a gap in the crests was found, and crossed six ranges before camping for the night on the top of a particularly large whaleback. Every range was of the same dual character for the greater part of its length: a low whaleback up to a mile wide of coarse firm sand, with a chain of crests of fine mobile grains lying on the top along the brink of the eastern side. Sometimes if the crested chain was very big it occupied most of the top, sometimes it was absent altogether, in which case the eastern slope of the whaleback was very firm and easily climbed.

Anywhere in the neighbourhood of the crests, though, the sand was soft and yielding. We got stuck many times even after learning to avoid the obviously dangerous spots; for there were other places, pools of "liquid" sand, in appearance

just like the rest of the surface, but so soft one could plunge a six-foot rod vertically into them without effort.

Fortunately these "liquid" pools were seldom more than a dozen yards wide, and often if one was driving fast enough the momentum would carry through them, the wheels ploughing huge furrows, churning up a cloud of grains, the lorry tossing and swaying about like a cork in water. One never knew where these patches were, so always drove as fast as possible. Often the foremost vehicle would pitch forward nose-first, half burying itself in a sudden pocket of this peculiar dry quicksand. The violent halt hurled the occupants forward or bounced them into the air. Then the others stopped, if they could, on firm sand, got out and came to help, all except one man whose job it was to walk on ahead trying the consistency with his feet to find a firm way round.

The light car was always got out again with the aid of channels and ladders, though sometimes only after half a ton or more of sand had been scooped away. But the lorries if badly stuck were much more awkward. When one is thirsty and the sun is hot it is not an encouraging sight to see a lorry with its back axle beneath the surface, and to know that there is no bottom to this sand for at least a hundred feet below. The more we dug away the deeper sank the wheels. In the worst cases after a lot of scooping we built platforms of wood from broken-up petrol cases underneath the back axle, very carefully so as not to disturb the sand. With these platforms as supports the whole lorry was lifted up to surface level with jacks before the channels were slipped under the wheels. Sometimes the sand under the jacks would give way with a grunt and it all had to be done again. It took a

great deal of time and it was all very exhausting when repeated a dozen times a day.

But we were learning all the time. Each dune range was like the last; from getting to know one of them well we came to recognise and avoid the bad places in the others by something vaguely unfriendly about certain curves and certain faint changes of tint.

One has always to avoid giving the back wheels of a car any sudden jerk, either in starting or stopping. By letting in the clutch a tiny bit too quickly the back wheels will begin to spin, and in doing so will dig holes for themselves by kicking out a shower of sand grains from underneath. Once that happens the car will never climb out under its own power. Similarly when stopping; if the brake is put on just a little too hard, the wheels will skid and disturb the delicate piling of the sand so that the grains will no longer remain in place to support the pressure of the wheels. However firm the sand is, once its piling is disturbed, even by someone's footmarks, car wheels will fall into the disturbed places as if into puddles of water. When a car is standing still on a firm surface of blown sand one should therefore avoid walking about just in front of the wheels. Otherwise there may be difficulty in starting.

We learnt a new thing about tyres too. Often the sand was just not firm enough to support the wheels, so that the cars were unable to grind through it even in lowest gear. It was hot and we were tired. Risking the probable damage to the tyres, Prendergast let most of the air out of his lorry wheels so that the pressure was only 15 lbs. instead of 90 lbs. and the tyres squashed out flabbily. The result was marvellous. The lorry sailed along over everything except the actual quicksands, and

left the others far behind till all had followed suit. Nor did any harm come to the tyres in consequence.

Next day we pushed on westward with one lorry and the car, leaving the other lorry and a dump of stores at the camp on the dune-top where it was fairly conspicuous. We wanted to save petrol and to lighten the loads in the hope of making better way.

I was a little chary about leaving anything behind, because if a wind were to blow up all our tracks might disappear and it might be very difficult in this country, where the landscape repeated itself bewilderingly with identical parallel dunes, to find the camp again, but our petrol was getting very short and further progress with all the vehicles would be risky. There was another consideration too, for the western slope of each dune range was far softer than the eastern; easy enough to get down going westward but much more difficult to climb up again on the return journey, and it was better to have only one lorry to cope with than two.

Soon the solid ground, which between the last ranges had narrowed to strips a hundred yards wide, disappeared altogether. There was now nothing but sand. The lanes between the big ranges, here about a mile apart, were occupied by plains of undulating sand rising in places to rounded billows forty to seventy feet from top to bottom. The surface was firm but astonishingly difficult to drive over. The absence of any detail to focus the eye upon destroyed all sense of distance or speed or even of gradient, and one was very apt to find oneself moving at forty miles an hour on the top of a large steep billow heading straight for the edge, without any idea of having climbed it. Differences of light and shade by which one normally recognises slopes and outlines were

altogether missing, so that variations in the real colour on the sand actually suggested false contours.

Indeed the whole aspect of this strange country altered with every movement of the sun in the oddest way. Sharp changes took place twice a day—in the morning when the sun had risen to an altitude of 35 degrees and again in the afternoon when it was again within 35 degrees of the horizon. For between 30 and 35 degrees lies the critical angle at which loose sand grains begin to flow, so that no sand slopes can be steeper than this. While in the early morning and late afternoon, therefore, the big dunes stand out as high cliffs casting grey and purple shadows, during the midday hours nothing can cast any shade at all in the whole vast area of the Sand Sea. At the right time in the morning one can see dark mountains collapsing, as one watches, into curving mounds of glowing gold.

All this time the light touring car had been a source of perpetual wonder. Giblin and Fernie ran about in it everywhere, climbing steep slopes within a few degrees of the angle of collapse as if they were on a solid roadway, even daring to change gear if the gradient became too steep.

But the steepness of the billows was too much for the remaining lorry, and presently it too was left behind, four of us going on for another ten miles in the car alone. Finally, that dived head-first into an unseen quicksand. It was the end. It was the worst stick we had had and took the four of us an hour to get it out.

It was sad to have to turn back, but to go on with only one car would have broken our chief desert rule, and to take the lorry along with us would have been most laborious and slow. For every mile we had gone westward we had actually driven more than two miles, zigzagging north and

south to find a way through. It was most improbable that the dunes were less than a hundred miles across and that would have meant a journey of 400 miles across and back. We had nothing like enough petrol for all that.

Providence was kind to us going back. There had been no wind strong enough to obliterate the tracks, so that the journey to the edge of the sand was easy enough. Thence we turned south-east for Dalla.

Dalla is a lonely spot, in a typical oasis depression carved out of the desert plateau by the wind. Steep cliffs enclose the north and east sides, while the gently rising ground to the south and west is choked with dunes. The depression is uninhabited. In the centre, five to ten miles from the cliffs, a few feeble tussocks of tamarisk and grass are scattered around a little hill on which stand one or two straggling date palms.

In the course of time the moisture around the artesian spring collected dust and sand which slowly formed a small mound and choked the spring. Cleared out by successive generations of bedouin and re-choked again, the mount grew higher and higher till the present hill was formed. The water used to flow out of the top of it from a stone-lined shaft built by the Romans, but it remained choked till Prince Omar Toussoon, going there shortly before us with lorries and cement, cleared the shaft out and roofed it over. He led the water out through a pipe so that it ran down the slope of the mound in a stream in which we now washed and padded and splashed happily after a fortnight on four pints a day.

We then proceeded south, meaning to return as was originally intended via Dakhla and Kharga

Oases. Fresh from the giant dunes of the west the little ones south of Dalla were mere child's play; we laughed at them, driving over their tops in sheer bravado. But the sand soon took its revenge. On the very top of a rounded dune some fifty feet above the ground Prendergast's lorry gave out a ghastly clatter and stopped.

We stood around sadly and looked at the pool of black oil spreading over the bright sand, and at the little heap of gear wheels and cracked cast iron which had dropped out.

This was disaster. It was the first time in all our travels that a breakage had occurred which we couldn't mend somehow on the spot.

Clayton, we reflected, would certainly have carried a spare gear-box. He always carried spares for everything that might possibly break. But Clayton's principles about spares were different from ours. The Desert Survey moved deliberately from place to place, sending back for supplies when necessary. They could afford to carry a lot of stores, whereas we had to cut down everything to the bare minimum in order to have the maximum amount of petrol. We had with us only the spare parts we knew were prone to break. Still, that gear-box had been on our list of parts to bring, and had been crossed off at the last moment to save weight!

There were two alternatives; to abandon the lorry and go on with the programme with the other two vehicles; or to go straight back to Cairo for a new gear-box. That would mean three journeys of over 300 miles each, and we had just ten days left before our leave was up.

The first alternative was attractive, and there would be little difference financially, balancing the price of a second-hand lorry against the

cost of the petrol for the extra journeys; but it would be like abandoning one's wounded to the enemy. We felt we ought to make an attempt to save it.

It was a race against time. We returned to Dalla, picked up Prince Omar's old tracks and set out direct for Cairo.

Several precious hours were spent in climbing up the cliffs. The prince's lorries had used the gentle slope of a fine big sand drift which ran from top to bottom; but the very best sand will take only one lot of cars, for once the piling of the grains, carefully and slowly arranged by the wind, has been badly disturbed, it will be soft and treacherous for other cars for months afterwards.

We reached Cairo via Baharia in three days and a half, went straight to the agent's for the necessary stores and started back for Dalla, in extra haste lest, in the rising wind, the dune should come to life. We were none too soon, for it had already begun to swallow up the offending lorry. A large hole had formed, with the lorry in it, heeled pathetically over on one side like a ship about to sink.

Only three days of our leave were left. Prendergast and I worked most of that night reassembling the transmission, trying not to get sand into it from the surrounding dune. At last it was done—the lorry salved from a sandy grave. We got back to Cairo with half a day to spare.

As amateur explorers we had found out little of note, except the general arrangement and formation of the dunes in that particular place; and the desert, always on the watch for an opportunity, had caught us out badly both in the matter of spare parts and of petrol consumption. It was a sharp lesson not to under-estimate its cunning.

But nevertheless a discovery of importance had been made, namely, that with light cars, and with our technique of channels and ladders for extracting them when stuck and of the adjustment of tyre pressure to suit the consistency of the sand, the dunes could be conquered by motor transport. We had broken the old tradition. Even if there was still much difficulty with heavy lorries, owing to the trouble of getting them out of the inevitable pools of quicksand, and to their high petrol consumption, it was clear that the latest light Ford cars were quite able to get about among the dunes.

CHAPTER VII

THE SAND SEA

A FORTNIGHT later, by the middle of December 1929, BurrIDGE and I were back on the Indian Frontier, settling once more into the army's groove. The lorry had been left in Cairo to be disposed of by Prendergast, who finally sold it to a stone merchant. We had driven it close on 6000 miles and were not sorry to see the last of it.

But gradually my mind began to hark back again to Egypt. It was not right that things should be left in the present state. The dunes could be crossed, and I longed to have another try. My five years' tour of duty abroad would be up the following autumn so that I should then in any case be leaving India for home. Six weeks in Egypt could perhaps be squeezed in on the way home.

A correspondence was started with Holland in England with a view to getting a party together. Owing to the Indian situation it was impossible again to rely on anyone being able to get leave from there, and the authorities in Egypt were still rather sticky about allowing officers leave in the winter months. Only Prendergast seemed a likely starter from there. So it rested with Holland to produce three others besides himself from England.

Meanwhile the local situation on the Frontier had changed for the worse. Demonstrations and riots fostered by agitators supplied with money from the extremists began to occur in our own Province nearer and nearer to the inflammable tribal territory in the mountains. In May 1930 the storm

broke. Two police posts in the Tochi Valley were besieged by armed bands of Wazirs several thousand strong, the famous Circular Road through Waziristan was closed, and Razmak itself, the summer headquarters of the district, all but invested.

June and July went by while the authorities were trying by persuasion and reasoning to combat the agitation, but the centre of trouble only shifted to the Mahsud country within a few miles of Razmak. At last patience was exhausted, and military operations brought the handful of misguided leaders to see realities after two days' fighting. Peace returned as suddenly as it had departed. Our little war over, we watched critically while the neighbouring districts coped with the same wave of trouble as it rolled northward along the Frontier.

During those few months the atmosphere of Razmak used to change quaintly from hour to hour. By day the usual pursuits of peace went on undisturbed. The troops played hockey just outside the perimeter wall. The annual summer horse-show was held on the landing-ground near by, guarded by armoured cars at each corner. Squadron after squadron of aircraft flew overhead meanwhile, laden with bombs for the disaffected villages, till the smoke of the bombing drifted across the show ground. At sunset the band of one of the battalions would play in the gardens outside the club, followed soon after dark by a hail of bullets spattering down the asphalt roads from some disrespectful tribesmen up on the hillside.

Looking back through the file of correspondence I find it rather remarkable how that autumn's expedition in Egypt was ever got together. Much of the details were settled by long cablegrams between England, Egypt and Waziristan, and for three hectic months prior to the actual assembly of

the party in Cairo it seemed very doubtful if I should be able to get away.

Here I must outline briefly what was then known about the interior of the Sand Sea.

Though the existence of an immense mass of sand south of Siwa was known in the time of Herodotus, the discovery that the dunes continued southward far into the interior was not made till 1874, when the German explorer Rohlfs, setting out westward from Dakhla into the great unknown, was held up by the outermost ranges.

“The outlook was gloomy,” he says. “Sand dunes with sand between, an ocean of sand, this was the one thing that might make any farther advance impossible for us. Any other hindrances could have been overcome. Mountains could have been climbed. . . . There could be no fear whatever of hostile dwellers in an area bare of all human beings or living creatures; all care had been taken as to provisions and water—but an unbroken sandy sea brought everything to nought. . . .

“It was quite impossible to advance westwards, for at distances of 2—4 kilom. one sand ridge followed the other, and each was over 100 metres high. They all ran north to south with a slight N.W.—S.E. incline. If we had tried to go forward due west we should probably on the first day have got 20 kilom. on, and would have had to climb over six ridges; on the second day we might have gone the same distance; on the third we should have certainly not gone more than 15 kilom., and on the fourth day perhaps 10 kilom. This would have been all that could have been asked of the camels.

"We should then have been 65 kilom. farther west—but what then? The beasts might have been able to do another 50 kilom. after resting several days, but that would certainly have been all. And how were we then to come back? . . .

". . . As our reconnoitring had shown the direction of the dunes to be always the same we thought we would try to advance northwards or N.N.W. following their line. We should perhaps after a few days' journey reach the end of the sandy region and could then anyhow take a westerly course. It might be possible to reach Siwa by some yet unknown road."

So Rohlfs with his companions Professor Zittel and Dr. Jordans went north-north-west towards Siwa along lanes between the great dunes. Before starting they built a cairn and named the place Regenfeld because of a miraculous fall of rain. "Will ever man's foot tread this place again?" he wrote. From his account one gathers that he saw little of the land beyond the particular lane in which he was hemmed. He was evidently upset by the unexpected defeat of all his plans for the exploration of the unknown west, horrified at the unearthly landscape into which he and his caravan of seventeen camels were entrapped and in perpetual anxiety as to whether enough of his camels would survive to bring the expedition to safety. For Rohlfs' was a truly prodigious feat, standing almost alone among camel journeys. Although he had left Dakhla carrying water in iron tanks so that on the seventeenth day all his animals had at least something to drink, it was not until thirty-six days after leaving Dakhla wells that his camels reached Siwa. He had covered 420 miles, 300 of which lay through the dunes, without finding water

and without meeting any vegetation except a little grass on nearing Siwa.

From 1874 until 1930 no further published details were added to the gloomy and forbidding picture left by Rohlfs. Then Colonel de Lancey Forth, formerly commanding the Frontier Camel Corps, recovered sufficiently from his long and ultimately fatal illness to publish an account in the *Geographical Journal* of his own wanderings between 1921 and 1924 in the Sand Sea, by whose fascination he was the first to become bitten.

He had made two big camel journeys. On the first he travelled among the outlying dunes north-west of Dakhla, penetrating as far west as Rohlfs' route; and on the second succeeded in working southwards from Siwa for 200 miles along the dune lanes, probably reaching latitude 27 at a point fifty miles west of Rohlfs' route, but he still saw no signs of the western side of the dunes. Unfortunately he carried no theodolite or any means other than a compass for fixing the actual routes he took, so that in each case they must remain undetermined. It was a pity, for his journeys were very daring, and an accurate record of them would have helped a great deal. He found pieces of ostrich shell everywhere, and many ancient flint implements among the dunes. One note in his paper in particular caught my fancy:

“About eighty miles south of Siwa, also in a natural camping ground such as one would still choose to shelter in, in the bay of a dune, I saw some flint instruments lying in the sand, and jumping off my camel to pick them up, I disturbed the sand and disclosed ashes under it. I had the top layer of the sand carefully removed, disclosing under it the bed of a fire with burnt

ostrich shells and flint knives in the ashes. The ostrich eggs had evidently been cooked on it and neolithic or palæolithic flint knives were lying in the ashes. In what age that fire had been lit I do not know, but the sand had not covered it up more than a few inches since that period."

He also found hand grinding-stones, which seem to indicate a former grain-eating people living among the dunes.

To complete this sketch of the exploration of the extreme west of Egypt we must shift our attention southwards. Efforts to explore the south-west of the country started in 1911 when Mr. Harding King made an adventurous camel march south-westwards from Dakhla for nearly 200 miles, urged on by fragmentary legends of an unknown oasis in that direction. Though he would not in any case have reached 'Uweināt (afterwards discovered to be the fact behind the legends), as it was still another 180 miles farther on, it is sad that his march came to an untimely end owing to the disloyalty of his Arab guide who tampered with his water dumps. The country was an unending lifeless plain of sandstone dotted with low hills, but here and there he found some slight traces of an old caravan route running in the same south-westerly direction.

Six years later, in 1917, Dr. Ball with Lieut. Moore of the Light Car Patrols pushed out by car, again from Dakhla but in a more westerly direction than Harding King, for more than 200 miles, and rounded the south-eastern extremity of the Sand Sea before being finally held up by lack of supplies and by very rough hilly country. On the way they came upon a large depot of old pottery water-jars

at the base of an isolated hill more than 100 miles from Dakhla or from any known water or vegetation.

Then in 1923 Hassanein Bey appeared at El Fasher in the Sudan, having marched for 2220 miles from Sollum on the Mediterranean coast, via Kufra, which oasis he was the last visitor to enter before its final capture by the Italians nine years later. The news he brought of the real existence of the hitherto legendary 'Uweinat as a high mountain mass isolated by deserts, with a local population of black Guraan and a permanent water supply, altered the whole situation. For if only 'Uweinat could be reached from the Nile, it could be made a base for further exploration, if anyone had the financial means and the capacity to organise such a large expedition as was then thought to be necessary for the undertaking.

Immediately afterwards, Prince Kemal el Din, son of the Khedive Hussein, set out on a preliminary trip with his private fleet of Citroen caterpillar cars, but was held up that year by rocks and sand dunes not far from Dr. Ball's farthest point.

The following year he prospected the country from this point northwards with Dr. Ball, rediscovered Rohlf's cairn at Regenfeld, recovering a message Rohlf had left in it prior to committing himself to the sand dunes just fifty years before, and with it some of his iron water tanks, still bright and unruined.

In 1925, again with Dr. Ball, he reached 'Uweinat without difficulty direct from Bir Terawi in the east, and finally in 1926 he went there again, this time from the direction of his earlier attempt in the north-east so as to leave no gap untried. On this last journey he discovered that though the Sand Sea appeared to end near latitude 24 among the rocks which had held him up before, these formed

the beginning of a great sandstone plateau, which he named the Gilf Kebir and which, rising from the plain by a single sheer cliff, still barred any passage westward.

Thus from Siwa southward for 500 miles an impassable barrier separated Egypt from the unknown area of desert farther west, composed of the Sand Sea in the north and of the great cliff of the Gilf Kebir in the south.

The country to the west had an added interest, apart from the fascination of the giant dunes, because of its association with the vague legends concerning the existence of an undiscovered oasis called Zerzura, of which more later on.

During the summer Holland had been busy in England. Through the good offices of the Royal Geographical Society he had got into touch with W. B. K. Shaw, who in turn collected his former travelling companion D. Newbold, the latter happening luckily to be home on leave from the Sudan. Both of them agreed to join us. The sixth member of the party was Second-Lieutenant D. A. L. Dwyer, Royal Signals, of Holland's own unit at Colchester.

The general plan had been arranged by correspondence. It was ambitious, but this time we thought little had been left to chance. I had arranged with the Shell company while still in India for 500 gallons to be sent to Dalla by camel via Baharia. From here we would strike out straight across the Sand Sea to the western limit of the dunes wherever that might be, and thence southward to 'Uweinat, which all of us wanted to see, especially Newbold and Shaw, both of whom were keen archæologists. Shaw in addition, being a botanist, was anxious to collect specimens of the plant life of such an isolated mountain district.

Another smaller dump of petrol was to be made, by arrangement between Shaw and the Governor of Halfa Province, at Selima Oasis on the Arba'in Road to assist on the return journey to Wadi Halfa.

On the basis of distances being doubled when winding through the dunes, the total journey between the two dumps at Dalla and Selima would not be far short of 1300 miles, for the whole of which we must rely on the petrol we could carry with us. For water there were the springs at 'Uweinat on the way, but in order to be on the safe side in case of a hostile reception there we decided to carry enough to last for at least sixteen days, which should take us all the way to Selima if necessary.

This distance between dumps being just outside our capabilities, it would be necessary to form a third dump somewhere in the Sand Sea by making two journeys forward from Dalla.

Food supplies for a whole month had again to be taken, and Craig, although bitterly disappointed at not being spared by the authorities to come himself, nevertheless generously came over from Ismailia to arrange all the buying and packing.

The loading of the cars had been gone into very carefully. All the stores, as well as the petrol, were packed in the wooden petrol cases so that as far as possible there should be only one size of box. The car bodies, designed by Prendergast and built in Cairo, measured an exact number of these cases in breadth and length, and everything in consequence fitted snugly in its place without risk of being damaged by the violent bumping it would be subjected to. Everything possible too was done to economise weight; bumpers, bonnets, radiator covers and even mudguards were taken off, partly to lighten the load and partly to make the cars easier of access for rapid repairs.

The expedition left Mena on the 13th October, after a halt at the Great Pyramid for Shaw to check our three aneroids at a point of known height above the sea.

Prendergast and I knew the 300-mile run to Dalla by heart now, after the three trips back and forth last year, and could have driven there without a compass or map even if our old tracks had disappeared. A few days later Dalla too was left behind, and its few straggling wisps of vegetation faded away below the skyline as we drove westward towards the dunes.

The first sand-bank soon hove in sight. It was a smooth whaleback without crests. I went straight for it, keeping an interested eye on Newbold, who was by my side as navigator noting the compass bearings of our course and the mileage readings. I was sure he didn't really believe in this business of crossing dunes; it was against all the ideas of his sixteen years' service in Egypt and the Sudan. Everyone knew that cars were no good in soft sand. But the same performance as last year was repeated exactly. We arrived at the top and felt the same sensation of ballooning over the surface without apparent motion. "How did you know that was going to happen?" he asked in astonishment, and I could only answer, "Because it happened on another dune sixty miles away last year. And what is more," I said as we began the descent on the farther side, "in a few yards we shall strike a narrow belt of soft sand about half-way down where we shall probably stick." Neither of us could see anything ahead in that glare, but it was so, almost before I had finished speaking. We only just got through by the help of the downward grade, and by Newbold leaping out to push.

The dune ranges here, as I had hoped, were of

just the same character as they had been farther north, but the desert between them, before it disappeared altogether, was more rocky.

With tyres pumped hard (even harder than is recommended by the makers should the cars be grossly overloaded as were ours), we never had any tyre trouble whatever in true desert country, where there are no troublesome thorns. Good tyres will stand up well, without even the treads becoming worn, to any amount of scrambling over bare rocks and bouncing over stones. Similarly, in continuous sand they will stand being run flat for several thousand miles. The difficulty begins where sand alternates with rocks and stones. One has to run with the tyres soft over the sand to prevent the car sticking, yet they must be hard again before a single patch of stones is met with. In this case trouble with burst tyres is a question of will power, for it is not at all easy to force oneself to stop in the hot sun at midday and pump up four tyres by hand from 10 to 40 lbs. pressure. We lost six new covers that first day, all burst internally by collisions with rocks when they were being run soft.

But by the end of the day we had driven sixty miles from Dalla, and all traces of solid ground and rocks were left far behind (or far underneath us). There was nothing now but the great whale-back sand ridges lying side by side like an infinite raft of logs, along each of which grew the uncrossable dunes like notched caterpillars end to end in continuous chains.

At first they seemed impossible to cross, but luckily a short delay high up on one of the ridges occurred just at the critical hour in the afternoon. The sun's slanting rays, skimming the long hillside of the dune ahead, picked out for us in grey shadow all the steep loose slopes, while

gentler slopes remained in sunshine. A little narrow lane of sunlit sand appeared in one place only, in the forbidding wall opposite, running slantwise up it as a road up a cliff. Looking more carefully we noticed that here the thin pointed nose of one of these twenty-mile-long sand creatures had overtaken the blunt tail of the one in front, and had turned sideways to avoid it, down the eastern slope of the ridge on which both were lying, leaving a narrow uphill cleft between them. There was just a chance that its bottom might be firm enough to carry us.

Stopping at its foot I walked up it steeply for a quarter of a mile till the top of the range was reached, in order to judge by the impress of my feet whether the cars would go. There was only three yards width of firm going along the bottom, but it was continuous all the way. The first car would get up easily, but we knew that if the wheels of either of the other cars got caught in the grooves of disturbed sand made by the car in front of it, its wheels would certainly stick, and then, in the effort of extracting it, the whole delicately arranged piling of the surface would be destroyed for the last car. It called for skilful driving, for, with heavily loaded cars running all out up a slope of loose sand with flabby tyres, control is none too good. All three cars got up safely. From the top we looked for and found a similar pass up the side of the next range; that too was crossed with only half an hour's delay digging out one car.

We had found a weak place in the armour of the dunes. We were for the time one up on them. Other crossings followed rapidly during the remainder of the afternoon, though not without much use of channels, ladders and pushing, till just before sunset the cars one after another fell

into a quicksand from which we were too tired to extricate them that night. They were in up to their axles at the bottom of a deep trough at the foot of a 200-foot range and there they stayed for the night.

The humming engines were switched off and silence fell like a bomb. Camp: everyone sat still for a moment listening to the complementary humming dying away inside the brain. Ropes were unlashd, bedding rolls thrown off the cars flump on to the sand, fire-pot and cooking gear unloaded, petrol cases split open and the car tanks filled up for the morrow, water drawn and a fire kindled in the pot.

Those silent evenings were worth many times the heat and labour of the day. Now at last there was no hurry to make the most of the daylight driving hours, for the day was gone. Holland walked leisurely away to plant his wooden time-signal mast in the sand at the end of the little aerial wire: Shaw got out the theodolite ready for darkness and his favourite star, while Newbold finished the plotting of the day's dead-reckoning course—a complicated zigzag course meandering through the dunes. Prendergast and I sauntered round the cars looking for ailments and collecting the spare wheels whose tyres were burst and wanted doctoring.

Then came dinner—tinned food with cheese and army biscuits—and we lay back on the cool loose sand watching the stars, idly running the clean dustless grains through our fingers in fine hour-glass streams, talking, or listening in silence for the observer's "up" as a star moved across the theodolite telescope and the chronometer time was noted down.

We were now very close to the line of Rohlf's journey. He was in our minds a lot that evening.

We pictured him hurrying along at the bottom of one of these endless parallel valleys at two miles' an hour, day after day, seeing his camels dying one after another, and wondering if he would reach Siwa. It was well enough for us, bursting into this world from the side, having travelled for but one day away from solid ground, conscious of our ability to get out again and with supplies in plenty, but Rohlf's had been in it for weeks and had to get to Siwa or die. "It was," he wrote, "as if we were on a wholly lifeless planet. If one stayed behind a moment and let the caravan out of one's sight, a loneliness could be felt in the boundless expanse such as brought fear even in the stoutest heart. And the deeper we penetrated into the sand ocean, the stronger this feeling was. If the wind or a storm be a sign of life, the lack of it, however annoying it had been, had an almost crushing effect. Nothing but sand and sky! At sea the surface of the water is moved, unless there is a dead calm. Here in the sand ocean there is nothing to remind one of the great common life of the earth but the stiffened ripples of the last simoon; all else is dead."

And we pictured, too, his evening camps of half a century ago—the scientist Zittel quite undismayed still measuring the ozone-content of the atmosphere, and Jordans setting up his instruments to fix the latitude. They had run short of charcoal fuel by now, and had begun to burn their packages to cook with, so presumably there were few hot dinners to look forward to. But Rohlf's remarks: "Great pleasure was got directly on arriving from a little glass of Hennessy brandy with some biscuits."

We had our evening cocktail too, reserved for the end of particularly trying days, consisting of equal parts of rum, whisky and lime-juice to which

Worcester sauce was occasionally added for variety and the mixture sprinkled with pepper. It was a relic of the old war days, invented as far as I can remember at Trones Wood by the doctor of the 20th Divisional Engineers with whom I used to serve.

Next day the crested ranges began to open out, and the country became gradually an oily swell of sand. Only occasionally did short crested dunes still emerge from the sand. How high we were above the ground it was impossible to tell, but it seemed as if these were just the tops of the big sand ranges left unsubmerged by the general sand inundation. The farther we went west, the rarer these crests became. The country was open; one could drive, with care and a good deal of inevitable sticking, in any direction at will; and it was clear from the information collected by Col. de Lancey-Forth and from the description of Hassanein's and Rosita Forbes' journey away on the other side of the Italian frontier, that this billowy surface continued westward for a great distance. In this latitude at any rate we were through the really formidable part of the Sand Sea.

But 'Uweinat lay to the south 350 miles away in a direct line—probably 500 miles for a party feeling its way through this land. Before returning to Dalla a dump had to be made as a jumping-off place for the next move forward. The spot decided upon was an open space in the dunes farther south along Rohlf's route, which from his account seemed a conspicuous place, easy to find when we came again from Dalla with a second load. Rohlf called it Ammonite Hill and mentioned cliffs and rocky pillars. De Lancey-Forth too had seen a hill with flint implements near it somewhere in the same area, though his positions were unfortunately

vague; and close to it, he said, ran the somewhat mysterious route by which occasional caravans from Kufra were known to travel to Egypt.

It lay a good distance to the south-east but was almost in a direct line from Dalla to 'Uweinat, and if necessary we could push out west again from there just as we had done now. The dunes had been identical for so many miles that there was no reason to suppose their character would be any different in the south.

So the course was changed to the southward. We ran over sand waves as on a switchback, one car after another disappearing below succeeding waves and rising again gradually, every few hundred yards.

There was absolutely nothing to be looked at besides the two other cars, nothing but the eternal smooth curving outlines of the sand repeating themselves with geometric regularity. If only there had been a stone or a single plant it might somehow have seemed natural, for we were accustomed to a lack of life. Once look away from the other cars and all sense of distance and size was lost, for no kind of gauge was left. Not that that in itself mattered, for there is no detail to be seen on the flatness of the great sand-sheet around Bir Terfawi or in an aeroplane flying through fog. But here, moving over these waves of blackness one felt giddy, thinking unconsciously that it was they that were moving—undulating—and then realising that they were still, with the same shocked sense of unbalance that one gets in a railway station on finding that one's own train has begun to move, while the other is stationary.

Only once did we see a definite thing—a single black object on the skyline like a large stone cairn, and in some excitement drove towards it. But a

small hawk got up and flew away, and our cairn was gone.

Ever since entering the dunes we had been visited at every halt by solitary little birds. Appearing from nowhere they would flit around silently, alighting for a while to watch, head on one side, craving as we did for something to look at, and perhaps hoping for food. And when we departed they would sit pathetically looking at any empty tin we had left behind before finally hopping into its shade to die. They are evidently the stragglers from the north and south migrations to and from Europe, the weaklings who can go no farther and are lost in the immensity of the desert without food or water. The mortality amongst them must be very high. Sometimes we found sheltered hollows in the dunes which were full of their little skeletons, many deep, covered with a thin layer of sand. It is strange they should choose to follow this route instead of flying along the Nile. Perhaps it is a blind unchanging custom many thousand years old dating from the days when the country was still a green prairie land.

We were now travelling parallel with the universal direction of the dunes, that is a few degrees east of south. On 19th October after passing to the south of latitude 26 a change took place. The enormous accumulations of sand farther north here diminished in thickness, allowing the dune ranges to emerge again, and presently small strips of solid ground lay exposed between them.

The general character of the dunes changed too. Any physical obstacle with which one struggles for long, whether it be a great snow mountain or a field of dunes, becomes endowed with some degree of personality. In the north the dunes were short and swollen, gorged with nutriment from the glut

of grains which in places almost overwhelmed them. They had seemed quite friendly, without evil intent, too big to bother about such a tiny invasion of their empire. They had let us crawl over them without much hindrance once we had got to know them.

Here the dunes were leaner but of far greater length, uncrossable lines of complex crests resting directly on the desert floor. They were hostile, resenting our presence.

We managed with great difficulty to cross one of them, but after that were forced to drift southwards for twenty miles vainly looking for a passage eastwards towards Rohlf's Ammonite Hill. The dunes were mocking us, driving us like sheep hemmed in a lane of hurdles in a direction we did not want to take, seeking to cut us off from the direct route back to Dalla. Our goal was twenty miles away to the flank, but we were drifting past it to the south. We positively had to break out of that lane and work eastward across successive dunes. It took the whole of that afternoon to go ten miles, though more than four times that distance was covered in hunting for possible places at which to cross; climbing up the sides by charging them at speed; getting hopelessly stuck, backing down the slopes once more and trying again elsewhere.

Then suddenly, running over a stretch of rolling sand, we struck the caravan route from Kufra to Egypt—fresh footmarks not a month old of thirty-five camels, a donkey, and two men and a boy walking, leading north-east towards Rohlf's Ammonite Hill over the dunes, which were here a little easier to cross.

A thirteen to fifteen days' camel trek by a commercial caravan covering 350 miles without water or grazing, half of it across a sea of high dunes, is

without equal elsewhere in the world. It can surely have been attempted fitfully in the past only when dire necessity forced the Kufrans to use this route after all other trade outlets had been blocked.

In the heyday of the Senussi rule at Jaghbub, at the time of Rohlf's journey, when safe trade was opened up between Kufra and the northern coast, it is possible that this direct inland route to Egypt was disused and perhaps forgotten. Anyhow Rohlf appears never to have heard of it, for otherwise all his plans for 1874 would have been different and he would hardly have regarded the crossing of the dunes as so impossible a feat.

Ammonite Hill was disappointing. By a mis-translation of the German "berg" we had expected a hill, but what Rohlf had meant was clearly the low rocky escarpment which we found, hidden from view by the dune ranges that had crawled over it and quite useless as a landmark from the north. De Lancey-Forth's hill was nowhere to be seen. Had we known that there was nothing here, and that the dunes were far worse than they had been in the north, we should never have come this way, but would have made our dump far out in the open rolling sands near the Italian frontier whence we should have had a clear run south to 'Uweinat. In the north we had already crossed the worst of the dunes. But where there is nothing on the map, one can but guess at the best routes, and we unfortunately guessed wrong.

Dumping seventy gallons of petrol near the top of the little cliff, with thirty gallons of water and a quantity of food, we left immediately for Dalla, which was reached the following day, 21st October. In five days we had completed a tour of 400 miles wholly through the dunes, which till last year had been considered impossible for any motor vehicle.

We spent a whole day at Dalla resting and overhauling the cars and on 23rd October set out for 'Uweinat. Next day Ammonite Dump, too, was behind us, empty now save for a sack of unwanted potatoes, some old burst tyres, and forty gallons of petrol left there against the possibility of a retreat to Dalla if we were unable after all to go forward. Will ever man find that store again? Probably not, for it was concealed behind a mound out of sight of any chance Arab party who might pass along the Kufra track. Its latitude and longitude are known, but who will ever go there? Possibly some traveller in the dim future may stumble upon these strange relics just under the sand as did De Lancey-Forth upon the Stone Age man's boiled egg!

The plan was now to follow the Kufra camel track south-west for a hundred miles, and then to turn south, reaching 'Uweinat by the unknown western side of the Gilf Kebir plateau.

There was little difficulty at first, though the cars were very heavily loaded, each one having on board eighty-six gallons of petrol, fifteen of water, as well as food for eighteen days.

But on the 25th the sand became much more difficult—a succession of high crested ranges less than half a mile apart, each one of which was climbed only with great effort. The cars wallowed about helplessly on soft irregular sand terraces beneath the topmost crests, and there was trouble again in getting down the western slopes, which were much softer than the eastern ones.

We struggled on across seven ranges, each one worse than the last. At the top of each we hoped to see something better beyond, but always a similar angry wall of sand appeared across a 150-foot deep ravine.

The country was now definitely hostile to us.

A hot desiccating south wind had been blowing for some time. Now, towards midday, big grains rose into the air, attacking our eyes and faces with little smarting stabs, whistling past our ears, swirling into every corner of the cars, into our pockets, down our necks, everywhere. We were stuck on a terrace high up on a dune side, hurrying to scoop the grains away from around the wheels a little faster than they were flowing in. The wheel-grooves of our coming, running over the surface behind each car up to the bases of the now stationary back wheels, began to move sideways down-wind, leaving the cars standing isolated from the tracks they had made, as if they had been miraculously dropped from the sky. The whole surface was flowing past us; it surged round our feet, excavating hollows into which they sank unexpectedly as we stood.

The bulk of the grains flowed as a dense fog, rising no higher than five feet from the ground. Over it we could see each other quite clearly, head and shoulders only, as in a swimming-bath. Up above, the great fine-grained crests of the dunes were on the move. Cornices dissolved as we looked, swaying along the curving surfaces in heavy dark folds, as if the mane of some huge animal was being ruffled and reset in a new direction by a gale.

Keeping on the move, driving blindly with eyes all but shut, and without speaking lest one's mouth should get full of sand, fortune steered us clear of the worst quicksands while the storm lasted. The strange surface bore the weight of the cars even though it was flowing across our path. Luckily we had not been caught while trying to cross the fine sand of the upper crests.

We tried to cross one more range when the storm was over. I climbed up to the top of a high crest

to see what was on the western side. At each step I took, a sound came out of the surface of the dune, a low growl which increased, as my feet slid downwards on its steep loose flanks starting rivers of disturbed grains, into the loud vibrating hoot of the so-called "Singing Sands."

It took two hours to get across that dune, and after that we gave it up. Like Rohlf's we had to turn along the direction of the dunes—perhaps they would get better farther south, so that we might still work westwards around the unknown western side of the Gilf Kebir.

As before, there was no difficulty in going on in the one direction. The two neighbouring sand ranges on either side of us were a couple of hundred yards apart, and presently a firm though rocky floor of Nubian Sandstone, black and purple, appeared between them.

The farther south we pushed, the higher and more uncrossable the two walls became, continuous geometrically-regular saw-toothed structures without an apparent break or opening and monotonously straight, running on and on, disappearing over a white horizon.

But the next morning, 26th October, though the same two dunes still went on, hills could be seen ahead in the distance. We were nearing the hills country now which had held up Ball and Moore in 1917, and were coming out of the Sand Sea to meet the end of their track. The land was rising fast. If only we could reach the real broken country of the northern edge of the Gilf Kebir there was more than a chance that the dunes would break up, for their usual habitat is a flat, smooth, open plain.

But just then there happened the one unmentioned thing each of us had had at the back

of his mind for days—ever since we had felt the enmity of the sand. The unending golden walls on either side began to close in upon us.

The long trough narrowed, becoming choked with billows of fine yielding grains through which the cars were pushed with increasing difficulty yard by yard for half a mile more. At last all three sank to their axles in a wide lake of bottomless quicksand. We were trapped.

The dunes had selected this of all places for their second attack; the farthest point away from anything to drink, either water or even milk from grazing camels, anywhere in Africa, possibly anywhere on the mainland of the world—the exact centre of a lifeless circle of country 360 miles across, equidistant from the wells of Abu Mungar, Dakhla, Bir Terfawi, 'Uweinat and Kufra.

The rays of the midday sun were concentrated on us from the glaring concave sand slopes around as by a burning glass. The air shimmered like that above a red-hot stove. There was no shade left even underneath the cars, for they were sunk up to their bellies; we all were exhausted after many days of work and were very dry. Even the five-pint water ration we had had since the south wind had started was not enough to make up for what we were losing by continued physical labour in this desiccating air among the dunes.

The amount of water one wants varies greatly with the time of year and the latitude. For our short winter trips in the north near Cairo we had never wanted more than three pints a day—one pint as tea for breakfast, a pint at lunch with lime-juice, and the rest in the evening again as tea, but with a little whisky or rum in it. But now it was much earlier in the year and we were farther south;

even with a five-pint ration one got very dry in the heat of the day, not so much from the heat alone as from the combination of rushing through hot air and the alternate labour of pushing and digging. Probably one could do with a good deal less, if plodding along on foot or on a camel.

One of the extra two pints went into our water-bottles, to be sipped at odd times to keep one's mouth moist, and the other was reserved for the evening after the day's work was over. It was normally no good drinking much extra during the day; however much one drank then left one just as thirsty, and the extra liquid simply evaporated out almost at once.

Holland and I waded on ankle-deep for a mile to a projecting rock to get a better view of what was ahead. The others lay on the sand looking blankly at the cars. Two of the party were beginning to suffer from the sun. The outlook was depressing. It was impossible to move in any direction except back the way we had come.* On both sides we were hemmed in by dunes no cars could cross, and to go forward was out of the question. There was nothing for it but retreat. But even between us and Ammonite Hill lay range after range of dunes whose western slopes we had only just been able to force the cars down; and to get them up again would mean another serious struggle, worse than the one which now confronted us, of turning all three sunken cars round in the quicksand, getting them on the move and urging them all the way back to hard ground.

There remained one chance, that somewhere in the last eighty miles we had come there lay a possible way out to the east or south-east that we had not seen. It meant giving up all hope of exploring the west side of the Gifl Kebir, but that weighed

very little at the time, as long as we got away from these infernal dunes.

But no one made any effort to move. Shrinking from the mere thought of grappling with cars, we lay still, dreaming pleasantly of iced beer at Wadi Halfa, rather interested, in a detached impersonal way, at our own apathy.

Then someone had a bright idea. We broke into the water supply and had an extra pint all round. The effect was marvellous; the water acted as a stimulating drug. In a few minutes everyone was up and doing, setting about extricating the cars, on their knees scooping out sand from around the wheels and laying out channels and rope ladders. After two hours' work they were out, standing again on firm ground with all the scattered extricating gear repacked on board.

We had not driven for more than twelve miles back on our tracks before by great good luck the hoped-for and previously unnoticed chink was found in the eastern dune wall, through which all three cars managed to pass without getting stuck. The neighbouring corridor or avenue was wider, with good firm ground on its floor, and open as far as we could see to the south. Down it we fled as fast as the going would allow, intent on nothing but escape from the fiery dunes.

At last they began to break up amongst groups of friendly solid hills. But for many miles farther we could see them still pursuing us in long persistent tongues of gold, dodging between the purple hills, keeping abreast of us like a pack of wolves.

Then they too dropped behind and we saw them no more. It was as if an oppression had been lifted. At the same hour, by coincidence, the parching south wind also ceased, and was followed almost immediately by the cool north breeze of

winter which remained with us for the rest of the journey.

It was 4 p.m. The sun's fierceness was over for the day. The going was good. Confidence returned and there was no more question of going back. To-morrow we would meet Prince Kemal el Din's tracks and follow them all the way to 'Uweinat. We camped early, in the shelter of a big black rock below a hill of pleasing solidity, to celebrate Shaw's birthday as well as our escape from the Sand Sea. For the first time during a journey of 700 miles the dunes were out of sight and we were free of the atmosphere of instability and continual impending movement they suggested—waves that ought to heave but remained still day after day, breakers just going to break but waiting motionless till suddenly unloosed by a gale to overwhelm the intruder, sixty-mile-long worms whose notched segments one expected to see starting a concertina motion. Here there were real rocks that breathed a restful permanence—decent haphazard things with no hint of the monstrous elusive organism of the dunes.

Within forty miles the hills to the west gathered themselves up into single sheer cliff, at the top of which lay the unknown plateau of the Gilf Kebir. For a hundred miles the great cliff went on. It seemed like the frontier of some "lost world," unscaleable, at least for car or camel, unbroken except where the mouths of deep unlit gorges appeared as black slits, from the bottom of which an ancient debris of boulders spewed out fanwise for miles into the plain.

It was tempting to go and explore one of those gorges. What might there not be far inland up the valleys which they drained? Perhaps even

a little vegetation; for at our camp on the evening of 27th October a swarm of flies had appeared suddenly, attracted by our bright headlights. Whence had they come if not from some green stuff near at hand? And yet the nearest known life was at 'Uweinat more than a hundred miles away. Or if they had been blown up by the recent south wind, there was no greenery in that direction for many times that distance.

But it was impossible to get close to the foot of the cliffs without risking the cars, for the whole plain was strewn with the boulders washed down from the highland above by the rains of a past age. Even while keeping several miles away we had to crawl along on bottom gear. An expedition on foot, carrying water for two or three days on our backs would have been necessary to do anything useful, and our water supplies did not permit it. We had to go on direct to 'Uweinat.

'Uweinat is peculiar in several ways. It is a mountain 6000 feet high—high enough to attract a little extra local rainfall of its own which collects at its foot in two permanent pools, so that unlike any other Libyan Desert oasis it is quite independent of the general artesian water, which in this region lies far underground. The slight additional rainfall keeps a certain amount of vegetation, small trees, scrub and a little grass alive inside the deeper valleys, when all the country round for many hundreds of miles is a true howling desert.

The mountain itself consists of a flat-topped block of sandstone ten miles across. It rises by a 2000-foot continuous vertical battlement from a cluster of foot-hills through which several valleys radiate. It looks from any direction like some colossal crumbling citadel surrounded down below

by the mounds of its ruined town. The western end is extended farther by a granite mass of lesser height and different appearance, making the whole length about twenty-five miles from east to west; two pools of water are situated at the foot of the long southern face, one at each end.

Across the open plain fifteen miles to the south, opposite the centre of this southern face, another mountain, a solitary granite peak called Kissu, rises sheer out of the flat desert to a height of 5000 feet. The pair of mountains are visible from forty to ninety miles away according to the ever-present haze.

The unusual height of these mountains, rising suddenly out of the general surface of the desert, makes one greatly under-estimate their size and the distances between one point and another, for their shape and general appearance is not very different from that of any ordinary little desert hills. After first sighting them on the skyline from a low rock at lunch-time we were still ten miles away from Karkur Murr, the nearest of the two water pools, at camping time in the evening.

The following morning as we were driving off, excited at the prospect of seeing water and trees again, and at the view of the great cliffs ahead, my car made noises of serious internal trouble. It is difficult at once to locate a breakage in some part of the transmission; the sound seems to come from every part together. Eventually, by poking a little finger cautiously through the oil-hole of the differential casing while the wheels were turned round, we found two empty spaces in the crown-wheel, where two teeth had broken off. They must have begun to crack yesterday going over the vile country along the foot of the Gilf, and were now lying about somewhere in the thick oil, ready

to jamb between more teeth and burst the whole differential.

We had considered this eventuality before starting out, and had come to the conclusion that if any teeth did break, they would get mixed up with the rest of the differential and burst it before the car could be stopped; and we certainly could not carry spares to replace it all. So again we were caught with no replacement for a vital part. By removing the broken crown-wheel, though, the car could be towed along freely, and as there were no known dunes between 'Uweinat and Halfa, we might possibly have got it back.

Prendergast and I set to work at once to dismantle the back axle; but, alas, the wheels refused to be sprung off their cones, and with a last powerful heave the wheel-puller stripped its threads and became useless. A heavy sledge-hammer would have done the trick, but we had saved weight by leaving it behind. Unable to pull the two halves of the axle-housing apart we could not get at the insides, and were helpless. We tried every thinkable expedient but the wheels would not budge.

It occurs to me, having written this, that these details might have been omitted. It is perhaps in some way indecent to mention the insides of cars. A travel book is expected to contain other technicalities such as the names of obscure plants and animals of which not one person in ten thousand has ever heard, and it is permissible to describe the intimate ailments of camels and their cure. But anything mechanical seems to be taboo. Still, I shall leave it as it stands, just to show how important a bearing these sordid little details have upon the success or failure of a modern expedition.

There was no alternative now but to abandon the

car. It could not be towed, and time certainly did not allow of getting what was required from Cairo, 700 miles away even by the shortest route. We unloaded it, therefore, hiding its petrol together with our emergency reserve of food at a spot some distance away, and stripping it of all its sound tyres to provide needed spares for the other two cars. These were now seriously overloaded. Each had to carry an additional passenger perched uncomfortably on the back, with his kit and food, as well as the extra proportion of the dead-weight of spares, instruments, theodolites, cameras, medicine chest, etc. At each jolt over the rocks and water runnels near the foothills of 'Uweinat their chassis bumped dangerously on the back axles; I expected a spring to break at any moment.

It was a mournful business leaving that car behind. It looked so small and pathetic out in the open by itself amongst an immense debris of rocks. It seemed such a shame to throw it away like this—a new and beautiful bit of machinery, each part fitting perfectly with its fellow, unworn and just run-in; and the new body, too, that Prendergast had designed and fitted out so carefully only a few weeks ago. However logically I said, "It is only a bit of metal after all" it was impossible not to feel an attachment for one's car. Responsive to the slightest touch, it had carried me so far and struggled over so many obstacles without objecting, that it had come to fit with the general scheme of things almost as intimately as my own feet.

We had no idea what population might be found at 'Uweinat. In 1923 when Hassanein Bey arrived he found the place occupied by 150 of the black non-Arab Guraan people from the mountains that lie on the far western side of the desert.

These people told him they had migrated from their own country when their independence was threatened by the French some years before, first to Kufra along the caravan road from Wadai, and shortly afterwards from there to 'Uweinat, which they found uninhabited. Here, in this lonely mountain, the voluntary exiles settled, far away from interference, under the leadership of their old tribal chief named Herri.

Hassanein in his book has much to say about this man, who had acted as his guide for a while, leading him from 'Uweinat towards his own home land in the south-west where he had left his property and relatives years before. But he refused to visit them again, turning sadly back to 'Uweinat when the desert edge was reached. Hassanein describes him as gentle-mannered and unassuming, with a benign smile, and an unquestioned dignity in his movements. Three years later Prince Kemal el Din found him there with a diminished following, and was greeted as courteously as Hassanein had been.

There would be little for us to fear from these Guraan, by whom motor-cars would be connected with another visit from the bountiful prince, but there was another possibility. It might have rained in the last year or so. If so, the bedouin from Kufra were likely to have come down with their camels to graze them in the mountain valleys. Our reception by them would be very doubtful, for at the best of times they were suspicious and hostile towards Europeans, and just before leaving Egypt we had heard that Kufra had recently been bombed by the Italians.

From a small-scale map made by Kemal el Din's surveyors we found his old camping site at the mouth of the little gorge of Karkur Murr without

difficulty. No one was there, though the sand contained footmarks of men and animals. A few straggling acacia trees grew in the dry gritty water bed just outside—the first green living things we had seen for 600 miles, ever since leaving Dalla.

The cars could be got no farther up the gorge, but half a mile beyond in the cool shadow of the rocks, tufts of grass were found in a damp salt-encrusted clay, and from the foot of a tumble of huge boulders which blocked the valley water seeped out, collecting in a tiny brackish pool. From the surroundings it was clear that the place was very dry and that no rain had fallen for several years. The water was barely drinkable and far less in quantity than had been described by Dr. Ball on the prince's visit.

It had been a trying and an anxious morning, with the loss of a third of our transport and the uncertainty of 'Uweinat; we were disappointed too on realising that our last chance of getting to the western side of the Gilf Kebir by a quick run northwards from here was now definitely shattered by the loss of the car; for it would be unwise now to travel with two overloaded cars a mile more than was necessary over the rocky country round the mountain. Fords are amazingly similar to one another; one crown-wheel had broken, it was even chances that another would break too before long, and we had 500 miles of untraversed country to cross to get back to the Nile.

There was real water here though, brackish though it was, and we drank it just for the joy and freedom of being able to drink without stint. Presently, when the party were rested and washed, with fresh clean skins free of accumulated salt and dirt, the prospect was not so bad. Plenty of interest was to be found on foot. Newbold and Shaw, who

for some years had been collecting details of desert rock-pictures found in the Sudan, were intent on seeing the pictures which Hassanein had found in a neighbouring valley; so also were Holland and I, for archæology in the right setting never failed to attract us. Shaw too had his botanising to do, and both he and I were seized by a desire to see what there was away up at the top of the great central citadel.

Next morning, leaving the cars in charge of Prendergast and Dwyer, the remainder of the party started a scramble up the gorge towards Hassanein's valley, cautiously at first with automatic pistols ready cocked. Within a mile a flock of half a dozen goats was met, and soon afterwards, around a couple of stunted date palms, a camel skeleton, a dead donkey, some more grass, and lastly two pools of lovely clear water without a taste of salt.

We were cutting across the eastern foot-hills along a rough track, with the huge pink cliffs of the central massif rising on our left. Some miles on, the track began to descend, leading into the flat sandy bed of a dry valley running out north-east from the main heights towards the open plain. On each side low vertical cliffs offered tempting surfaces at which an idle stone-chipping artist might pass away his day while his cattle browsed on the green-stuff in the valley bed. Some plant life remained even now; acacia trees grew in the sand, rooted in a little moisture down below, and dry cucumber-like stalks and leaves of colocynth creeper sprawling flat on the sand had not been very long dead.

Presently the valley widened; here, after a walk of nine miles, the first pictures appeared. At a casual glance they were very ordinary crude chip-pings about six inches in size, outlining men and animals, carelessly scrawled over the rock walls,

mostly on the shady side of the valley. They were very sharp and hardly weathered; in any other country one would say they were a few years old at most.

But when giraffes appeared, and horned cattle or antelope, and men with bows and shields, and later when on the roof of a cave red-and-white paintings were found of steatopygous waspy-waisted figures characteristic of the Bush-men paintings of South Africa, it dawned on one that these pictures were very strange indeed—dating from a long-past climatic age and a former distribution of mankind.

These rock pictures are found in many parts of North Africa, done in many styles, and are believed to vary in date over a great period of time, being the handiwork of many different peoples and races who have come and gone. Some are thought even to belong to palæolithic days ten or twenty thousand years ago. Their collection and classification are still incomplete, but a great deal of work has been done on them by the Abbé Breuil and others. The difficulty seems to be that they are very rarely found definitely associated with any other relics by which they can be linked to the existing framework of our knowledge of prehistoric times. One clear distinction between them can, however, be made; that is whether or not the pictures of animals include the camel, which did not arrive in Africa till the Persian invasion in the sixth century B.C. The majority of the pictures contain no camels, though without their aid few of the sites could be reached by natives in modern times without great difficulty owing to lack of water.

On the following day, while the rest of the party went back in the two cars to retrieve a notebook containing all our survey notes that had been acci-

dentally left fifty miles back along our route, Shaw and I climbed the south-eastern bastion of the main mountain in search of plants and anything else of interest that might be found.

It was by no means the flat-topped plateau it had looked from the plain; for the rock was hollowed out by a freak of erosion into spires and pinnacles over a hundred feet in height, separated by winding passages mostly so narrow that only the invisible mountain sheep, whose fresh droppings were to be seen in plenty, could squeeze their way through.

Wandering through this labyrinth, we came out at unexpected places to the threshold, as it were, of a broken doorway high up in the battlements of some ruined castle, with nothing but a sheer thousand-foot drop beneath. From these openings the enormous yellow plain could be seen, featureless and glaring with reflected sunlight, reaching away and away in all directions (except to the south, where the peak of Kissu many miles distant rose like a lone cathedral) to a vague hazy horizon. Once with glasses we caught sight of the two cars hurrying off across the plain—two tiny dots so far away that they hardly seemed to move, although seemingly just down below us, scarcely yet clear of the pimply black foot-hills. Soon they dwindled to nothing and were lost to view at a point still comparatively close to us, with the plain rolling on beyond them to a horizon far up in the sky.

With that little vision came a sudden overwhelming sense of the remoteness of the mountain—as if it included the whole world and was floating by itself, with Kissu peak as its satellite, in a timeless solitude.

At sunrise next morning, while breakfast was cooking and the sleeper members of the party sat

up still anchored to their blankets, a man walked quietly out of the gorge towards us, clad in the ragged blue garment of the Guraan.

We had known from fresh footmarks in the rock-picture valley two days before, that the place was still inhabited, but his actual appearance came as rather a shock. Except for the goats he was the first and only animal we saw during a thousand miles of our journey.

He knew a little Arabic, and he and Newbold chatted, squatting together on the ground. He was Herri's personal slave. Herri himself was ten miles away on the other side of the mountain. There had been no rain for several years, and Herri's following had dwindled to six men scattered over 'Uweinat in ones and twos scratching about for some sort of nourishment.

Hassanein had reported that in 1923 the Guraan were living on a kind of flour ground from the boiled seeds of the colocynth or bitter-apple. Shaw came across a dish-shaped grinding stone showing signs of a white flour on it which he thought at the time was from some sort of grain, for Kemal el Din in 1925 had seen a crop of grass growing in a mud-pan out on the plain near by. It may, however, have been colocynth grindings which we saw, though the place seemed now too dry even for that desert creeper.

We gave him a sugar-loaf and some tea, and he plodded slowly back into the gorge. Later we motored round to 'Ain Duwa, the western of the two water pools twenty miles away along the southern face of the mountain, hoping to find one or two of the others if not Herri himself; but it too being deserted, we were forced to leave the presents we had brought on a rock with a note in Arabic saying how sorry we were that he was out when we

called. Some months later in Cairo we had the satisfaction of hearing that our visit and letter was such an event that the old gentleman had mounted his camel and ridden straight to Kufra, 200 miles away, to tell them about it.

Since our visit this last remainder of the 'Uweinat Guraan have disappeared; it was a pity that we missed this chance of seeing probably the last permanent inhabitants that 'Uweinat will have for many years to come.

Our journey to the Nile at Wadi Halfa can be divided into three parts: first a stretch of 200 miles over a completely untraversed section of the plain to the small rock of Burg el Tuyur located and named by Newbold and Shaw during their camel trek of 1927; thence, by nearly the same route as they had taken, to Selima Oasis, a distance of 120 miles; and lastly, from Selima to Wadi Halfa for 150 miles along a line of petrol tins laid out in 1925 by patrol cars to mark the way.

The first 200 miles was a triumph for Newbold's navigation. This business is by no means as easy as its counterpart at sea, where a course is decided upon and kept to according to a chart comfortably laid out on a table. On land it is very different.

The driver steers wherever he can pick a way, dodging about to avoid rocks big enough to strike the belly of the car, making continual deviations around hills and other obstacles, keeping only a casual eye on the compass to maintain his general direction. The navigator must therefore be alert for every moment of the day's run, trying to read and keep a record of the compass bearing as it flicks about, and noting the mileage at each reading so that he may plot out the zigzag course afterwards from his notes. His work is made still more

difficult because the jolting is often so great that he cannot write at all, being entirely occupied in holding on, and must save up a string of figures in his head for the first smooth patch of ground.

There is no room to open out his map, and probably far too much wind to do so, for the driver just at the wrong moment wants the wind-screen open because the sun is shining on it and he can't see; so the map must be kept folded, bound to a small board with elastic bands cut from an old inner tube. He holds this and his notebook and his pencil in his hands ready for use, but at an instant's notice he must dispose of them all and leap from the car to save it by a timely push from sticking in some soft place. At every halt he starts work with a protractor, plotting out the course on the map from his almost illegible notes, while the rest of the party cluster round anxious to know where they have got to.

It was like this for most of the first 200 miles, for the plain for a great distance away from 'Uweinat was not at all the smooth painted surface it had seemed from the heights of the mountain. Later, as the edge of the great Terfawi-Selima sand-sheet was approached, the land became oily and featureless, presently without even a pebble—with a circular surrounding mirage and the tops of distant isolated dunes hovering up in the sky like golden lozenges.

Here at last Newbold, having set the compass to a fixed course for me to steer upon, could sit back inactively to meditate upon his camel trek with Shaw three years before across this same country, and to recall to mind the appearance of the little rock of Burg el Tuyur which they had found in the middle of all this flatness, the cairn they had built on it with the note and the ration biscuit inside, and the single prehistoric picture of

a spotted cow discovered scratched on the rock below.

We camped that night sheltered from the wind (it was very cold now and we drove wrapped up in coats) in the lee of a solitary crescent dune. The dead-reckoning from 'Uweinat made us a few miles short of Burg el Tuyur. It was too dark that evening to see far ahead, but with the first light both Newbold and Shaw were up on the dune top with field-glasses. There it was, one rock eight feet high, straight ahead above five miles away. We were within a mile of our plotted dead-reckoning position at the end of a two-hundred mile run!

To the eastward of Burg el Tuyur the sand sheet continued once more, until the broken ground was reached around the wide hollow in which Selima lies.

There is something wonderfully friendly about a Libyan Desert oasis, with its deep greenery of palms and grass backed by the brown barren cliffs and roofed over by a cloudless blue sky. Even the peculiar smell of salty sunburnt decay is a pleasure to a nose unstimulated for so long, as a sound would please one's ears after many days of silence. And when, under the palms, there is a shady pool of clear cool water, one loves the place. Selima is especially attractive—the oasis of a story-book, uninhabited by man and rarely visited, consisting of two little clumps of green palms, carpeted beneath with grass, and a small stone ruin of uncertain date.

It is very difficult to find, too, nestling under a purply brown hill in one corner of a large rambling depression the size of a small English county—unless by luck one stumbles on and follows the line of skeletons that marks the route of the old Arba'in Road.

Coming in from the west one sees no sign of Halfa, or even that the Nile is there at all, for

across to the east again the rocky desert continues as if one with the immediate foreground. The eastern hills get nearer and nearer, and still there is no Nile, no vegetation and no life. Even from the final slopes overlooking the water the river is unreal, without the greenery to which one is accustomed, like mercury lying in a trough, shrinking into itself without wetting or colouring the sands on either side. It seems impossible that a great river could be here at all.

Halfa keeps itself to itself, straggling along the eastern river bank, engrossed in the task of maintaining a spotless white-washed tidiness for the procession of high Government officials who break their journey here, to and from England on leave or duty. After a hospitable welcome by Mr. Jackson, the Governor, followed by an afternoon at telegrams and letters, the one and only decrepit taxi was commandeered—our cars were over on the west bank as there was no means of getting them across—to drive us into the town, where, at a Greek café, we did our best with all the beer we had dreamed of in the heat of the Sand Sea. It was here that the Zorzura Club was founded, which, contrary to the fate of most institutions resulting from a sudden impulse in a beer-shop, happens still to remain in being.

But there was a good deal of work, too, to be done at Halfa, for Newbold had to leave us to get back to his district in the Red Sea hills, and two whole days were spent with maps and notebooks sorting out topographical and other details, discussing carefully how they might best be handled and arranged, a foretaste of the coming weeks of work which the aftermath of a serious expedition entails. Petrol and provisions had in addition to be laid in for the 1000-mile journey back to Cairo.

Little time was lost over the return journey as far as Kharga. From Selima onwards the Arba'in Road slipped by, with its guiding skeletons scattered like whitewash splashed on a yellow carpet. On the remaining stretch of the old road, though, northwards from Kharga to the Nile at Asyut more difficulty was found. This section of the Arba'in had never been traversed previously by car, nor, since Dr. Ball had been along it many years before, had anyone reconnoitred it. For some reason it had been assumed in the past that the ascent of the surrounding cliffs out of Kharga depression was impossible everywhere, except as a *tour de force*, and for years all cars for use in Kharga and the desert beyond had been taken there by the light railway from Oasis Junction in the Nile Valley. In old days the caravans must have halted for some time in Kharga to rest or exchange their exhausted camels after their 800-mile march from Darfur, and no doubt to fatten up their merchandise ready for the slave markets of Cairo. In consequence the column of bones between Kharga and the Nile is inconveniently thin, so that we had trouble in keeping to the old track, and in tracing just where it climbed the cliffs on to the plateau above. After several abortive attempts, however, we found the ascent which the old Arba'in caravans had used. From the bottom the way looked quite impossible, but a track still existed, winding round spurs and gullies, and the cars were driven to the top of the 900-foot cliffs with hardly any new road-making. By this lucky discovery an easy motor route was opened up between Kharga and the Nile.

This lack of bones along the way was specially troublesome near the Nile, for here the old track is obliterated altogether by many local donkey

paths, each leading from a separate river village whence the Nile folk climb the cliffs in search of gypsum on the plateau above. Following one such false track we arrived without warning at the cliff's edge high up above the town of Asyut with no possible descent in sight.

It was Sunday morning. A rumble of traffic and native voices rose from down below. An English official and his friends were picnicking on the cliffs. I approached round some rocks and raised a very tattered hat. "We have come up," I said, "from the Sudan along the Arba'in Road. Can you please tell us the way down into the town?"

There was a slight but noticeable pause, and it dawned on me that news of this sort should have been more gently broken, for we were back in the real Egypt which knew only of the Nile cultivation. Sudan—Arba'in Road—cars on the cliffs. The Sudan probably called up visions of the night express from Aswan. The Arba'in Road was but a legend of the past, now non-existent; and cars belonged to the main road to Cairo, and had never been seen up on the desert plateau. They knew of no way down the cliffs.

CHAPTER VIII

THE GREAT DESERT

UP to now only that corner of the Libyan Desert has been mentioned which lies in Egypt, with 'Uweinat in its extreme south-western corner. I now ask the reader to consider the Libyan Desert as a whole, and to picture 'Uweinat at its centre. To most people, unfortunately, it will be a new picture, for by the arrangement of every English atlas the area is either cut in half one way or the other, each half being covered by a separate sheet, or else the maps jump suddenly in scale from a sheet covering the whole of North Africa to a large-scale strip-map of the Nile Valley. It is better shown in Italian atlases, in which their colony of Libya looms more important.

Till recently it has been customary to speak of the whole North African desert as the Sahara; but of late, with the now thorough hold of Italy on the hinterland of Tripoli and Cyrenaica and her revival of the ancient name of Libya for the two provinces, coupled with the French tendency to appropriate the word Sahara for their own more western territories, it has become common to divide the whole desert region into an eastern and a western portion, respectively the Libyan Desert and the Sahara.

There are more than mere political grounds for this distinction, for the Libyan Desert is cut off from the west by a strip of mountainous, and therefore to some extent habitable country, running

roughly north-west from El Fasher, and consisting of the highlands of Ennedi, Erdi, Tibesti, Tummo and Fezzan.

On the east the Libyan Desert is bounded by the Nile, which, flowing due north, gives the area a triangular shape spreading out towards the north where it reaches to within a hundred miles of the Mediterranean. In shape, therefore, it resembles the Indian peninsula, and, a fact which may be surprising but at the same time helpful, it compares with India in size.

This whole area, 1100 miles from east to west and over 1000 miles from north to south, consists of one huge unbroken tract of true desert—by far the largest in the world.

The only other true, that is entirely lifeless, deserts which can compare with it in size are those of the French Sahara and the western portion of the Rub 'el Khali or Empty Quarter of Southern Arabia. Rain falls everywhere in the world, so that the aridity of any desert is only a matter of degree. The French Sahara, though larger in extent, is relieved in several places by highlands such as Ahaggar, where it rains more frequently and from which water seeps underground to form many waterholes and oases far out in the open plains. There are, too, many areas where the desert rain makes grazing possible.

Much of the Rub 'el Khali is similarly not true desert, for it is inhabited by tribes. It is only in the more restricted western part of it that true desert conditions may exist. In Australia there are only a few comparatively small areas in which no vegetation grows.

In Asia such true deserts as exist at all lie in narrow strips barely a hundred miles across. Some idea of the relative conditions there can be gained from the fact that it is very rare indeed for Asian

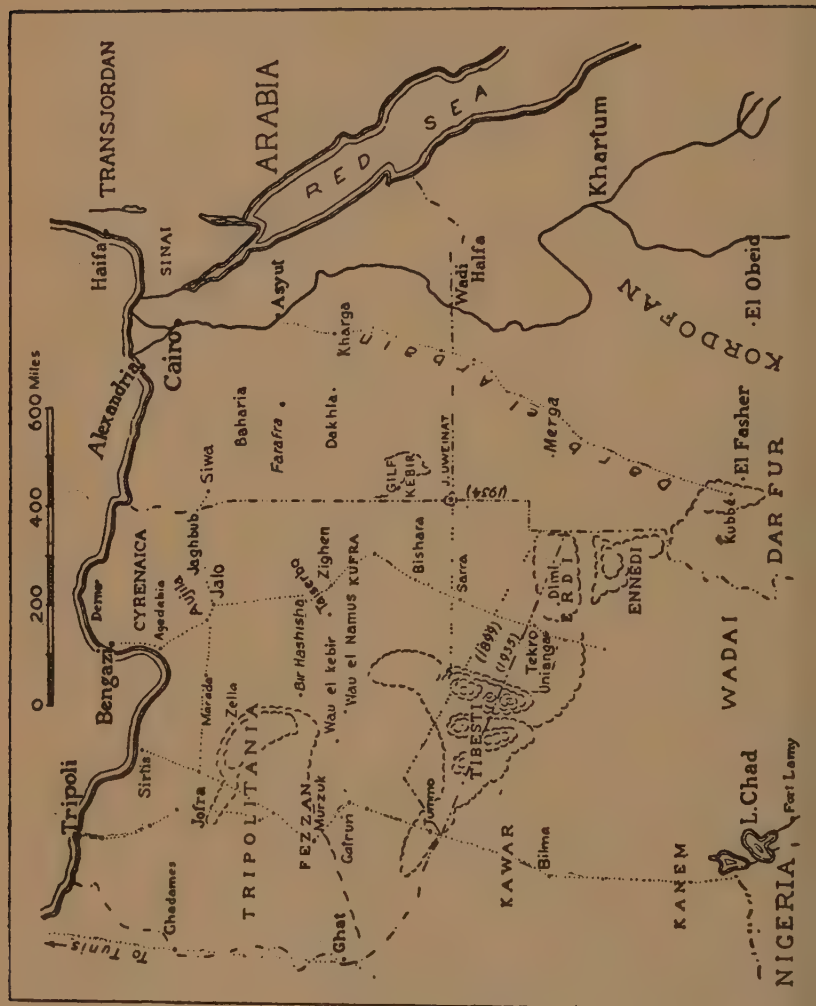
camel caravans to travel for more than five days between wells.

But in the Libyan Desert rain falls far too seldom and the surface is too sterile for any vegetation, even the lightest seasonal grazing, to exist at all.

It is almost uniform in character. With the exception of 'Uweinat there are no mountains worthy of the name, and the surface consists of gently tilted flats of bare rock, gravel and sand, with low hills, falling steeply to lower levels by escarpments over 1000 feet in height and continuous for 300 miles or more. In long streaks covering large portions of the country great systems of sand dunes have developed, with the biggest of which, the Egyptian Sand Sea, the reader is already familiar.

Scattered at intervals, often of several hundred miles, lie the oasis depressions, usually surrounded by cliffs, and deep enough to penetrate to the artesian water which is the only permanent source of supply in the country. The majority are small—a square mile or less of vegetation—and though uninhabited by man, support a few animals, desert foxes, jerboa or desert rats, some lizards and a snake or two. If these little spots are close enough together, separated by only twenty miles or so, a few gazelle may wander from one to the other. In the north, where seeds may be blown down from the coastal region or from the bigger oases, jerboa are found many miles from anywhere, and an occasional hawk in search of migrant birds may be seen. Insects, too, are sometimes blown long distances by the wind. Otherwise, in the great spaces between the tiny oases there is no life at all, and nothing moves but the dunes.

It seems that the country has been in this state of extreme desiccation for an enormous period, in fact since middle or late palæolithic times. Before



this, primitive man roamed and hunted over what must have been then a green prairie land, leaving his stone implements scattered indiscriminately about, all of them now exposed together on the pebbly residue of surface from which all traces of the old soil has long since blown away.

The old hunters disappeared when the last seasonal rains failed many thousands of years ago, and there followed an intermediate period lasting down to within a century of the present day, about which we know nothing definite as to the interior of the desert.

That during short interludes when a light grazing may temporarily have covered parts of the country human beings migrated across it, is a fact proved by the number of ancient drawings and paintings which have been found on the rocks far from any present supplies of water. But on the whole, from the time when palæolithic man departed, the human history of the desert must be restricted, like that of a dangerous ocean, to the history of the surrounding countries and their efforts to trade across its corners. Men ventured farther into it, opened up new routes across greater and greater distances, risking death and the loss of costly caravans at times when trade was good; and shrank away forgetting it all again in a generation when times were bad, allowing the memory of routes and wells to be forgotten.

From the earliest times, probably since the desert conditions first separated the fertile Mediterranean strip from the great fertile interior of Africa, a heavy north and south trade must have been carried on from one to the other, exchanging metals, cloth, grain and ornaments from the north with slaves, ivory, ostrich feathers, gums and curios from the tropics.

In ancient times there were four great routes northwards to the coast across North Africa. In the

west a road ran north from Timbuctu to Algeria; another ran from Kano in Nigeria through Air to Ghadames and Tunis: still farther east a third route from Chad, Bornu and Wadai, skirting the Tibesti massif, passed through Murzuk in Fezzan, reaching the coast at Tripoli, the ancient Syrtis Regio.

This last was the great route by which the Romans and the Carthaginians before them traded with the interior of Africa. Its caravans were alternately protected and raided by the tribe of the Garamantes, an evidently fairly civilised people probably of Berber stock who are mentioned as using four-horsed chariots and as occupying either Fezzan or Tibesti. It is probable that these Garamantes have a survival to-day in the Guraan, a branch of the Tebu (Berber) people who inhabit Tibesti, known in mediæval times as the Desert of Gorham, and are famous for their raiding propensities.

All these roads were probably in use long before the appearance in North Africa of the camel, of which the Romans first make mention in 46 B.C., for it seems that there were along them no greater distances between wells than could be covered with the aid of intermediate grazing by the pack animals then in man's service.

To the east of this great "Garamantean Road" there comes a blank space of a thousand miles across the Libyan Desert till we reach the last of the North African highways, the Darb el Arba'in, which, running north-eastwards from Darfur to join the Nile at Asyut, cuts off a corner of the desert.

Trade, therefore, from the countries south of the Libyan Desert flowed up in two streams east and west of it, reaching the coast via the Nile, and via Fezzan, but leaving the North Libyan oases of Jalo, Siwa and Kufra as well as the Cyrenaican

littoral without any direct communication with the Sudan. The central desert was uncrossable commercially even after the introduction of the camel, for the distances between the oases were deemed too great and the risks unwarranted.

The people of North Africa were Berbers, one of whose old languages is still spoken by a few families in Siwa to-day. Towards the south they probably merged imperceptibly, through inter-marriage, with the negro population of the forest country beyond the desert. Their chief transport seems to have been the horse and donkey, though the camel, probably introduced into Egypt by the Persian's Arab mercenaries in the sixth century B.C., apparently worked very slowly westwards till the Romans noticed it 500 years later. The extraordinary slowness of this westward drift of the camel, in a country for which it was the ideal form of transport, is still inexplicable.

Greek and Roman colonists spread along the coast and occupied the northernmost oases, remaining there until at last they were overwhelmed in the deluge of the Arab conquest which followed the Prophet's death in 632 A.D.

Alexandria capitulated to the Arabs in 641, and immediately afterwards their armies under the great generals Amr and later Okba began to pour westwards along the northern coast of Africa. Cyrenaica was conquered that same year, followed a few years later by Tripoli, Tunisia, Algeria and ultimately Spain. From Tripoli a force went south along the old Garamantean Road opening the way for subsequent waves in the eighth and ninth centuries to push the Berbers southwards towards Chad. By the twelfth century Arab penetration of the Sudan had become so strong that from that time onwards the fortunes of the southern border of the Libyan Desert were controlled by Moslem sultans in Wadai,

Darfur and Bornu who in turn rose to dominate the country.

But curiously enough the Arabs, though a camel-owning and a desert people, never penetrated in force from Cyrenaica to Kufra for another 1200 years, contenting themselves with the ownership of the more accessible oases within a hundred miles or so of the sea. After all, the 250 miles of barren and waterless sand and pebbles between Jalo and Kufra was a far greater barrier than they were accustomed to in Arabia, and in this new land where even the fitful Arabian grazing was absent, there was no particular point in migrating into the unknown. The Berber people therefore remained in possession of Kufra until the middle of the nineteenth century, as an offshoot of the large Tebu tribes who, in their mountains of Tibesti and Ennedi surrounded by Arab states, successfully resisted the Arab invasion.

Thus the position remained until the beginning of the nineteenth century, when the enterprising Sultan Sabun of Wadai determined to find a direct trade route north-east to Bengazi on the Cyrenaican coast.

An Arab named Shehaymah of Jalo who happened to be at the sultan's court undertook the task. Leaving the capital at Wara, Shehaymah led his caravan to Dimi, the last well on the edge of the unknown, and thence set out north-east. After a journey of 300 miles he reached 'Uweinat safely, and, working north-westwards again, finally arrived at Jao via Kufra, which, though it had been often raided by the Arabs of the north, was still in the hands of the Tebu.

Six months later Shehaymah successfully brought a still larger caravan back to Wadai.

In 1812 a third caravan left Wadai, again under Shehaymah's guidance, this time by way of Unianga

and Tekro, whence he attempted a new and more northerly or westerly route. After eleven days, so goes the story, their water having given out, the majority of the party left him to attempt to reach Kufra. The following day Shehaymah, wandering with his remaining men, came suddenly upon a Tebu village and a flowing stream, and, having replenished their water skins, reached Kufra in another six days, passing on the way the bodies of their companions who had died of thirst.

This story, besides containing the first mention, though under another name, of 'Uweinat, is the earliest account of a caravan using a direct route, from Wadia to Kufra, a route which during the nineteenth century became as important a highway as any of the other desert roads.

If the story of Shehaymah is true (and the description given of 'Uweinat is very correct), the whereabouts of his stream and village is still a mystery. In any case it is fairly certain that the direct trade route which subsequently came into being contained a barren waterless stretch of 360 miles between Tekro and Kufra involving a journey which is the extreme limit of a camel's endurance, only to be undertaken when the profit is very great or the rapacity of the officials controlling other routes make their use unprofitable.

This difficult route would probably never have come into prominence during the nineteenth century were it not for the appearance of the great religious teacher Sayed Mahommed Ibn Ali El Senussi and the subsequent rapid rise of the North Libyan oases to fame and importance.

The Grand Senussi was born in Algeria in 1787, was educated at Kairawan and afterwards studied theology at Fez. He then at the age of thirty travelled eastwards along the African Pilgrimage Route preaching a reform of the faith and gaining

a considerable following. Obligated to leave El Ahzar University in Cairo on account of his unorthodox views, he moved on to Mecca, where he joined another Moroccan reforming sect, eventually became its head, and built his first school.

At Mecca, too, he gained a powerful and lifelong supporter in Mahommed Sherif, prince of Wadai, who in 1838 became its Sultan.

In 1843 his reforming and purifying activities proved too much for the Meccans and he had to leave. Moving back to North Africa he founded "Zawias" or teaching establishments in Cyrenaica at Siwa, Jalo, Aujila and Derna, and finally settled down at Jaghbub.

He was a preacher of peace and good-will, law and order, and of the abolition of the religious abuses which were rife in the country. He found the desert trade at a standstill owing to the perpetual raids and wars amongst the lawless Arab tribes; but by his peaceful teachings, and apparently without the use of any force, he was able to put an end to the turmoil, so that trade revived and there was peace throughout Cyrenaica. Even the turbulent Zwaya tribe, who had recently conquered the dark-skinned Tebu of Kufra, invited him to make his home there with them, offering him a third of their possessions in land and palms.

At the same time, in active co-operation with his friend the Sultan of Wadai, now the most powerful Moslem prince in Central Sudan, with whom he maintained a close correspondence, he began to encourage trade between the two countries, to the great benefit of the surrounding oases.

On the succession of his son Sayed El Mahdi El Senussi in 1860 the Senussi influence had spread far and wide over the desert.

Sayed El Mahdi reigned for forty-two years as the head of the fraternity of Senussi teachers and

as the most powerful religious leader in North Africa. Though also virtually the sovereign of a country stretching from Egypt to Fezzan and southwards to Wadai, he chose like his father before him to remain a spiritual rather than a temporal ruler, leaving the country nominally in tribal possession.

The new Sheikh proved as great a man as his father. He encouraged trade and enterprise, despatching exploring parties in all directions to find additional wells and grazing for his people. The friendly connection with Wadai was continued, but the Sheikh wisely steered clear of all foreign entanglements and intrigues. In 1894, after an unwelcome visit from the Turkish authorities on the coast, he moved his headquarters from Jaghub to Kufra, thus making himself safe from all interference.

Fortune favoured the Senussi. The extortions and gross mismanagement of the Egyptian officials in the Eastern Sudan, the final explosion of 1883, and the horrors which followed under Mahommed Ahmed and his khalifa Abdullahi, effectively closed both the Nile and Arba'in routes to trade until the end of the century. Invited to join the movement, the Sheikh cautiously sent an ambassador to the camp of the sombre prophet, who now controlled an empire covering the whole of the Eastern Sudan from the border of Wadai to the Red Sea. Shocked at his envoy's report of the savagery and bloodshed of the Dervish rule, the Sheikh determined to have nothing to do with it, with the result that trade from negro-land was steadily diverted westwards to flow in peace through the oases of the Senussi along the route Shehaymah had opened up. Hassanein was told at Jalo that in the 'nineties an average of from 200 to 300 camels entered Jalo each week from the south.

If only that route could be made easier and the terrible 360 miles between Kufra and Tekro be shortened! If only water could be produced away out in the desert along the road!

The Sheikh began by digging an experimental shaft at Bishara 100 miles out from Kufra, and found water not far below the surface; but there still remained a barren stretch of 260 miles between here and Tekro. In 1898 the Sheikh accompanied by a small party reached a point in the open plain of the desert another hundred miles beyond Bishara. Here he is said to have dismounted and prayed for some time, after which he announced that water would be found here also by digging.

Gangs of six men, relieved each month, were maintained at this lonely spot and supplied with food and water by an endless succession of camel convoys each of which had to make a waterless round trip of two hundred miles even from Bishara well, itself far in the barren desert. If any evidence were needed of the power of the great Sheikh over the minds of his followers it is provided by the digging of Sarra well. The work continued steadily through the rock with picks and crowbars for eighteen to twenty months before any signs of water were discovered. Then suddenly an inexhaustible supply of good water was reached at the depth of 180 feet.

But the clouds of European conquest were now beginning to collect. By the end of the century, almost before Sarra well was completed, order had been restored by the British in the Eastern Sudan. At the same time French influence began to spread upwards from Chad towards the now enfeebled state of Wadai, and in 1909 it was finally taken over by the invaders. After a last vain effort in person to bolster up his old ally's resistance, the great Sheikh El Mahdi El Senussi died in 1900, leaving control of the Brotherhood to his nephew Sayed Ahmed.

In 1912, shortly after the collapse of Wadai, another European Power appeared. Italy, having forced the Turks to renounce all claims to Tripoli and Cyrenaica, at once set about the conquest of the country. In the west she was successful, occupying Fezzan in 1914 with little opposition; but in Cyrenaica, the home-land of the Senussi, practically no headway was made at all, the Italians being barely able to cling to the coast.

Sayed Ahmed, abandoning his predecessor's policy of religious isolation and aloofness from territorial interest in face of the European menace at his door, allied himself with the defeated Turks, whose followers were still numerous in the coastal regions. He also accepted assistance from Germany, who hoped to utilise the Senussi organisation to foment an outbreak in Central Africa which would drive a hostile wedge between the British in the Eastern Sudan and French territory in the west, thus perhaps linking up the German Cameroons with the Mediterranean.

In the beginning all went well. The Italians were driven out of Fezzan with great losses, and in the east, while the Sheikh launched his own followers into Egypt, Ali Dinar, Sultan of Darfur, threatened to do the same in the Sudan.

But unhappily for the Senussi the Sheikh had backed the wrong horse. Ali Dinar was crushed, the Arab invaders were driven out of Egypt and in the south-west the French under Colonel Tilho, working up still farther towards the desert, established their influence over all the mountainous regions of Tibesti, Erdi and Ennedi, destroying the last German hope of joining up with the Cameroons, and expelling every Senussi agent back into the desert whence they had come.

With the exception of Fezzan which was not reoccupied by the Italians till 1930, the end of the

Great War left the Senussi cut off from all trade other than with Egypt via Siwa, and with their sphere of influence reduced to the Cyrenaican oases, Siwa and Kufra.

Gradually, thereafter, although the resistance to the Italian pressure was successfully carried on by the tribes under the skilful direction of Omar Mukhtar and other leaders, the rule of the Senussi family waned, the various members living more and more as country gentlemen on their own estates. Sayed Idris, son of the great El Mahdi, who had succeeded Sayed Ahmed as the Sheikh el Senussi, disassociated himself for political reasons from the Italian war and went to live in Alexandria.

During all this time, up to the beginning of the 1920's, the knowledge possessed by Western geographers of the interior of the Libyan Desert was negligible. Though Rohlfs had in 1879 succeeded in reaching Kufra from the coast (barely escaping with his life), no traveller had ever crossed the desert from north to south or from east to west.

Kufra occupied a key position, a stepping-stone by which the desert might have been crossed, but with the hostile and uncertain Zwaya Arabs in occupation, controlled by the Senussi influence which remained jealous of any outside interference, Kufra was not available.

Though the position of Kufra had been fixed by Rohlfs, the southern oases of 'Uweinat and Merga were purely legendary, and their whereabouts were very vague. Even to the Zwaya Arabs the central tracts to the south appear to have remained practically unknown except for youthful memories of the older men.

It was not until 1923 that serious exploration of the interior began, though during the Great War Lieut. Fourché, one of Col. Tilho's officers, had

managed to reach Sarra from Wadai, nearly losing his life on the return journey through a bad guide and lack of water.

In 1921 Sayed Idris, being on good terms with the King of Egypt, had smoothed the way for Hassanein Bey and Rosita Forbes to visit Kufra from the north, and two years later, with the help of the friends he had then made among the Senussi family, Hassanein was able to return thither a second time with the idea of continuing his journey south-west to Tekro along the Sarra road and thence to El Fasher.

In Kufra, however, he heard for the first time of the earlier French patrol up the road from Wadai to Sarra. He therefore changed his plans, and after much difficulty in persuading the Arabs to supply camels for what they considered was a mad and perilous adventure, he started out on the little known direct route to Erdi, which was reputed to be most dangerous on account of brigandage by the Guraan people in the Erdi hills.

Arrived safely at Erdi after a long and anxious journey from 'Uweinat, guided by men who had not been that way for many years, he continued southward along a chain of water places in the foothills of Ennedi and reached El Fasher eight months after setting out from Cairo.

This was the first crossing of the Libyan Desert. The great importance of Hassanein's achievement was that by it the legendary 'Uweinat became a reality on the map, a known water point in the very centre of the desert, uninhabited by the Kufra Arabs and therefore available for use by other outside explorers without risk of complications. It led directly, as we have already seen, to the two journeys of Prince Kemal el Din from Egypt to 'Uweinat in 1925 and 1926.

In 1925, having established himself with adequate

supplies at 'Uweinat, the prince went on to the south-west for 180 miles to the beginning of the Erdi Plateau, where he achieved his ambition by shooting his first addax antelope. (He was a famous hunter.) He then drove due east for another 180 miles to the uninhabited and almost unknown oasis of Merga, which he placed definitely on the map just as Hassanein had done with 'Uweinat, completing a triangular trip of 500 miles by returning again to 'Uweinat.

This was the first expedition since Rohlf's time in which instruments were taken whereby both the latitude and longitude of places could be definitely fixed, for though Hassanein had taken a theodolite and had obtained good latitudes, the difficulty of carrying a wireless receiving set and taking time signals among suspicious Arabs had prevented him from taking any but very rough observations of longitude.

Next year the prince went due west from 'Uweinat as far as Serra well, whose position he likewise fixed for the first time.

In 1927 Newbold and Shaw, working up north-west from Kordofan Province on what is probably the last big camel journey to be made by Europeans in the Libyan Desert, reached Merga from the south-east, crossing the Arba'in at Bir Natrun Oasis. Then they pushed on into the central area as far as Burg el Tuyur rock and returned to the Nile at Wadi Halfa via Selima Oasis.

Thus in the space of five years the central desert south of latitude 22, enclosed between the Arba'in in the east and the French political boundary in the west, had been traversed by several journeys, and all the oases of which the Arabs had any recent or first-hand knowledge had been found and accurately located. Only the dim Zorzura remained unfound. Meanwhile the French, con-

tinuing the work begun by Tilho, had explored and surveyed most of their more favoured country behind the political boundary, which in general coincides with the western edge of the desert plains whence the highlands Ennedi and Tibesti start to rise.

Except in the north, where the struggle between the Arabs and the Italians still prevented exploration, no individual area greater than the size of Ireland remained untraversed.

In the north events began about this time to move rapidly. The first big step in the Italian plan of conquest—or of reconquest one might almost say—of the ancient Roman province of Libya was the occupation of the east-and-west line of oases, Jaghbub, Jalo, Marada and Zella; the so-called Line of the 29th Parallel. The seizure of this line, together with the reoccupation of Fezzan in the west and the closure of the Egyptian frontier between the sea and the impassable dune country by a barbed wire barrier, would effectively isolate the enemy's final stronghold of Kufra.

The occupation of Jaghbub took place in 1926 after the Egyptian frontier had been realigned so as to leave the oasis in Italian territory. Jaghbub was of particular importance, for it contained the tomb of the Grand Senussi and was the headquarters of the Brotherhood in Cyrenaica. In 1928 Jalo too was occupied, apparently without much opposition from the inhabitants, who seem to have become tired of the Senussi family. With the recapture of Fezzan in 1929 and 1930 the first part of the programme was complete.

A guerilla warfare was, however, still carried on by the bedouin tribes in Cyrenaica behind the new line by the redoubtable Omar Mukhtar, and in the interior by independent chiefs whose hostility

to the Italians the Senussi representative in Kufra was either unable or unwilling to prevent. Finally, Marshal Badoglio del Sabotini, who had now taken over supreme command of both provinces of Tripolitania and Cyrenaica, issued a proclamation that the tribes must either obey the Italian Government or be destroyed as rebels. It was to be a war with gloves off. There was really no alternative. Once having made up their minds to take possession of the country, it was impossible to leave independent marauding bands free to make surprise raids, to disappear into the interior and turn up elsewhere to raid again. As the Senussi leaders were said to have broken their agreement with Italy and to be incapable of keeping the tribes in check, the country had to be subjected to direct rule.

Several armed bands who still held out after the proclamation was issued were hunted down by aircraft and motor columns, and dealt with ruthlessly with bombs and machine-gun fire wherever found; and by the beginning of 1930 the situation was so well in hand that preparations could be started for the final operation; the capture of Kufra itself.

Though the opposition likely to be met with at Kufra and at the outlying oasis of Taiserbo was small, the problem of getting a military force there at all was something with which no European Power had ever before been confronted. It meant crossing 250 miles of waterless desert from either of the two nearest oases which had already been occupied, Jalo in the north or Wau el Kebir in the west. The most accessible of these, Jalo, was itself over 160 miles from the coast, while Wau was far inland and could only be reached from Fezzan.

As a result of the operations ending in the capture of Fezzan, it was found that the use of motor transport was not only possible but far better suited

to the country and more economical than the traditional camel columns of past desert campaigns. During the summer of 1930 several motor columns were therefore organised, each supported by aircraft; these were despatched from the north and west towards Kufra to reconnoitre possible routes by which the main forces might afterwards reach it.

The first column of thirty-two cars under Major Lorenzini set out from Bengazi in August, reached Zighen Wells 130 miles north-west of Kufra, and returned after verifying that the water there was plentiful. The accompanying aircraft, commanded by Colonel Lordi, went on farther and dropped bombs on Kufra to shake the morale of the inhabitants.

Two other columns started from Wau in the west with the idea of reaching Kufra by a direct route, but the vehicles of both were held up by an immense dune-field which was found to occupy the whole country west of Kufra.

Another column starting from Zella was, however, able to reach Taiserbo Oasis from the north-west via Bu Hashisha well and by a long roundabout journey through the dunes.

On the information obtained by these expeditions, the plan of action decided upon was as follows:—

The main attacking column consisting of camel corps, armoured cars and motor transport would march from Agedabia on the coast, southwards via Jalo to Zighen Wells. A second column of camel corps only, drawn from the army in Tripolitania, would advance from Wau el Kebir eastwards through the dunes to Taiserbo, accompanied by a supply column of motor transport, as far as it was possible for the latter to go, after which they would have to be self-contained. A third column of armoured cars would move down between these two, south-eastwards from Zella via Bu Hashisha

to join the Wau column at Taiserbo. The northern and eastern forces would then converge simultaneously on Kufra.

The main force moved out of Agedabia on the 20th December, 1930, on its 400-mile march to Zighen Wells. It was divided into three columns; the camel corps under Lt.-Col. Maletti, armoured cars under Major Lorenzini and transport under Major Rolle, and was supported by an air-force commanded by Col. Lordi. Jalo was reached on the 28th December, and Zighen on the 8th January, 1931, the columns encountering several severe sand-storms on the way. Meanwhile the other two columns joined up as arranged at Taiserbo about the 10th January.

On the 14th January the two converging forces, without motor transport, began their final 130-mile march across the dunes to Kufra, and on the 20th both of them, now close together, encountered the first and only organised opposition at El Hauuari a few miles out of Kufra. After a short engagement the Arabs fled, leaving Kufra to be occupied without further trouble.

Although so little fighting took place or was likely to do so, the whole operation must be considered a very bold undertaking, not on account of possible enemy opposition, but in face of the risk of the results of a single bad mistake in the arrangements for supplies and water for such large forces. They had very little time: the results of the reconnoitring expeditions were not known until the autumn, and the whole operation was required to be over by March, when the hot weather would start. Yet bases had to be made far out in the desert at Wau, Bu Hashisha and Jalo, to which huge quantities of food for men and camels besides petrol, oil and spare parts for both lorry columns and aircraft had to be transported.

The thing was a masterpiece of organisation, specially as far as the two western columns were concerned. Each moved 250 miles over difficult and practically unknown country, much of it through dune-fields which would have been thought impassable by anyone without desert experience; yet they were able to join up with one another at the right place and time, and to act in close co-operation with a third force advancing in another direction.

With Kufra occupied the Italians had at last no more to fear from the Arabs. The determined opposition which had been a thorn in their flesh for nearly twenty years was at an end. The whole country was subdued and every oasis under control. Thus did the tide of European domination and control close over the last area in the Libyan Desert where the Arab nomad might carry on his traditional free and independent existence.

Many of the folk who had settled on the land watered by the oasis springs remained behind, but the proud nomads, mostly of the Zwaya tribe, who had been the mainstay of the resistance to the invaders and to whom a settled life seemed impossible, decided to escape into the desert.

They had the choice of three equally desperate journeys, all without a hope of finding any grazing for their camels on the way; eastward across the Sand Sea into Egypt for a waterless distance of 360 miles; south-east to 'Uweinat but 200 miles away, though if it happened there had been no rain on the mountain they would be hopelessly stranded there; or, lastly, down the road to Sarra and French territory in the south-west, a journey without grazing for 500 miles but with fairly easy water stages.

The Italians were upon them, and there was no time to make the usual lengthy preparations for a

long desert journey, to feed their camels into good condition, to collect forage and food, or to test their water skins.

A few appear to have taken the road to Sarra, but the majority, which Shaw puts at about 500 men, women and children, went to 'Uweinat, where they arrived three months after our visit. Here the outlook was almost hopeless, for there had been no rain, and the existing grazing on withered thorn bushes was insufficient for their ill-prepared camels. There was nothing at 'Uweinat but water; they must leave the place or die.

A party of some 150 left with the intention of reaching Merga, 200 miles away to the south-east, where they hoped to settle. The remainder had no guide who knew the country—it is doubtful if any living man had ever been eastwards from 'Uweinat. Some of the best equipped parties went off vaguely eastwards into the blankness of the great plain. The rest, including the weaker ones with their families and small belongings, sat about the water pools waiting to die of hunger, or wandered aimlessly about the foot-hills. One party found our abandoned car and fired bullets at the offending European thing.

Just then, by an amazing providence, P. A. Clayton arrived on the scene, having run a triangulation survey from the Nile 500 miles away, completely unaware of the Italian operations in Cyrenaica or of the capture of Kufra, and expecting to find the mountain deserted except for the handful of Guraan we had reported as still living there. The first intimation he got that something unusual had happened was from the mass of fresh tracks both of camels and horses. Since the inclusion of horses in a big caravan generally indicates an armed and warlike enterprise, he was naturally somewhat alarmed, and still more so when, near Karkur

Murr, where he went for water, rifles were pointed at him from a party of men behind a rock.

He could do little for them. The nearest inhabited place where food could be obtained was Dakhla Oasis, 360 miles away, but hearing that some of them had already set out for it he directed the remainder to follow them, keeping to the old faded track made by Prince Kemal el Din's caterpillar cars five years before.

By a second coincidence Clayton had arrived at Wadi Halfa from Cairo, before starting his survey work, on the same day that we had come in from 'Uweinat, so that we had been able to describe to him the position of the abandoned car and of our hidden dump of petrol; and from Cairo we had sent on to him all the new parts and tyres wanted to get the car on the move again.

Clayton found the car. Sitting round it amongst the dry barren rocks ten miles from 'Uweinat pool, possibly hoping that it would give help in some miraculous way, were a party of ten women and children in the last stages of starvation. The only hope of saving them lay in getting the derelict car repaired. After a great struggle and continued use of heavy sledge-hammers they got the back axle apart; the broken parts were replaced by new ones and the car was made whole again. He packed the ten thin almost dead bodies into it and despatched it alone with one of his native drivers direct to Wadi Halfa. Here the pathetic cargo was rushed into hospital, where the majority recovered.

Clayton then used up most of his own petrol, augmented by what we had left behind, in scouring the country for other lost parties and directing them towards Dakhla. The survivors of one such party were found with only two exhausted camels left, the others having died or been killed in a desperate attempt to collect liquid from their bodies.

For an account of the subsequent fate of the refugees I will quote from a letter in *The Times* of May 25th, 1931, by Shaw, who happened to be in Dakhla shortly afterwards and talked to the survivors.

“Twenty-one days after leaving 'Uweināt three men in the last stages of exhaustion staggered into the police post at Teinda, the easternmost village of the Dakhla group. A few years ago when cars first began to run between Kharga and Dakhla, many different routes had been tried before the one now in use was adopted. The Arabs on nearing Dakhla had borne too much to the eastward, and, missing Mut, the headquarters of the oasis and the nearest point to 'Uweināt, had struck one of these early car tracks. This they followed till it joined the present main road, marked out with iron posts at five-kilometre intervals. Here some of the exhausted fugitives remained, while the strongest turned westwards along the last 25 miles of their journey to Tenida.

“On their arrival prompt action was taken by the local authorities. Camels, donkeys and later a car with food and water were rushed out along the Kharga road, and those left behind brought in. The following day more cars and a camel convoy were sent out from Mut to bring the survivors in there by the shortest route. The action of the Egyptian authorities undoubtedly saved many lives, but in spite of this a number estimated at between 40 and 100 perished of thirst and hunger on the way. One of the relief cars found a group of 26 dead whose attitude and expression showed only too clearly the manner of their dying. An Arab left his wife and small daughter a day's journey out from Dakhla, came in for a supply of water and returned to bring them in alive. Yet three days after reaching safety, despite what they had been through, a party returned to the desert to recover

some of their meagre possessions abandoned 60 miles away.

"The total number of Arabs reaching Dakhla was about 300. The first arrivals must have covered 420 miles between water over arid desert, a feat of endurance which can have few parallels in the history of desert travel."

On the other side of the picture it must be recorded in fairness to Europe that the Italian authorities at Kufra under Major Rolle have, as was to be expected, given many of the refugees every assistance to return to their homes.

Had it not been for this episode, Clayton would have carried out his original intention of exploring northwards from 'Uweinat along the unknown western edge of the Gilf Kebir plateau—the area we had failed to reach the previous autumn. As it was, he had only one spare day left, and but a small supply of petrol and tyres. In this one day though, with a single car, he managed to travel 260 miles and to sketch with a plane-table a stretch of 81 miles of the western cliffs of the plateau, finding at their foot rock drawings, pottery and other evidence of ancient occupation.

Interest in the Libyan Desert, confined for long to Prince Kemal el Din, Dr. Ball, Col. de Lancey-Forth and a few others, was by now beginning to widen, owing partly to Clayton's finds, the story of the refugees, and perhaps our own efforts in the Sand Sea, and partly to the continued discussion in the *Geographical Journal* as to the reality or otherwise of the unfound oasis of Zerzura. In particular the Gilf now became an exceedingly interesting place, an unexplored plateau between three and four thousand square miles in area apparently surrounded, except on the north sand-blocked side, by a single continuous vertical cliff over a thousand

feet in height and quite unclimbable by car or camel. Deep rocky gorges issued through its walls indicating a tremendous rainfall at some period or other in the past. What was there at the top?

The obvious method of attack was from the air; and the first man to take action was the Hungarian, Count L. E. de Almasy, an experienced pilot who had already been bitten by the lure of the desert on previous car expeditions.

In the spring of 1932 he was joined by Sir Robert Clayton East Clayton, also an air pilot, by Squadron Leader Penderel, and by P. A. Clayton, who was responsible for the survey work.

After an exciting adventure in which Robert Clayton and Penderel were all but stranded, they formed a base on the west side of the Gifl and carried P. A. Clayton's previous exploration another 70 miles farther north along the cliffs. Flying over the plateau in Robert Clayton's Moth they spotted a valley on it containing green-trees, but were unfortunately unable either to locate its exact position or to find the mouth of the valley in the cliffs at the plateau's edge.

Robert Clayton returned to England full of plans for another attempt at locating the vegetation he had seen in the autumn, but it was not to be. He died suddenly shortly after reaching England, at the age of twenty-four. Not content with this blow to Almasy's and Penderel's second expedition, fate also removed a very powerful helper in the person of Prince Kemal el Din, who died within a month of Robert Clayton; and everything had to be put off until the spring of 1933.

It is sad to record that within a little over a year the deaths occurred of no fewer than three more of the small band of Libyan Desert enthusiasts—Colonel de Lancey-Forth—after an apparent recovery from an obscure illness which had kept him in a hospital

for years, ever since his last journey into the Sand Sea in 1924; Lady Clayton East Clayton, Robert Clayton's widow, who was killed at Brooklands when on the point of setting out to carry on her husband's quest for the elusive oasis of Zerzura; and lastly Mr. Harding King.

CHAPTER IX

SIX THOUSAND MILES

THE preparation for an expedition is great fun; it runs on smoothly, oiled by expectation. And in the field one is keyed up by physical well-being and by the presence of the unknown. But after it is all over a reaction sets in; I grow appalled at the cold-blooded aftermath of months of work still to be done, just at the time when leave is up and arrears of normal duties press:—hundreds of aneroid readings to be juggled with in order to convert them by elaborate corrections into altitudes above the sea, topographical results to be dished up for the map draughtsman, the finances to be settled, papers and reports written, and photographs by the hundred dealt with. “This shall be the last,” I cry; “it is not worth all this labour!”

But time goes on, and in the end it is all done and past—results all published, accounts balanced and the files of correspondence put away. One settles down to other things, offices, tarred roads and the wet earth of England.

And then comes some trivial sense-impression—the hot-varnish smell of a car standing in the sun, a cloudless sunset, the finding of sand grains in the pocket of an old coat. Out comes the map again; and the eye hovers over some blank space still farther away which nobody has yet reached. Happy calculations follow about petrol and distances—dreams of just one more desert trip.

The thing was settled at a chance meeting between Shaw and myself in the map-room of the

R.G.S. over the latest Italian atlas which I had found lying opened, as if by destiny, at North-East Africa. There was no escape. Here were Shaw and I and the open map of the country of our dreams all brought together by pure chance. We would go out just once more, far out, farther than even Prince Kemal el Din had ever been.

There were three main areas of seducing blankness, omitting Italian Libya (which it would now be only a matter of time until it was explored and mapped). The first lay between our route in the Sand Sea and the Italian frontier; the second, west of 'Uweinat, between Sarra and the mountains of Tibesti in the triangle of Sudan territory which English maps showed jutting out westward as a wedge separating French Equatoria from the Italian country, but whose exact ownership was not satisfactorily settled; and lastly the southward tongue of desert due south of 'Uweinat between French Equatoria and the Arba'in Road.

After some discussion and correspondence we ruled out the first of these areas because it lay in Egypt, and the active Desert Survey were bound sooner or later to send P. A. Clayton there to complete the survey of Western Egypt. In any case the southern portion of it now belonged, so to speak, for the time being to the Almasy-Robert Clayton-Penderel party.

The other areas were well worth a visit, for the Sudan Government with its limited revenue was occupied exclusively in looking after its vast populated provinces and it would be a very long time before the Sudan Survey could tackle the remote barren areas of the north.

In both cases the map sheets were simply blank bits of paper with a grid of latitude and longitude, a few doubtful dotted lines and a question-mark or two. Presumably the country was all desert;

there was little chance of finding anything spectacular in the way of geographical features, but as our plans advanced it became clear that the country was by no means empty of scientific interest, especially as regards its geology and archæology, not to speak of side lines such as botany, bird migration, animal life, etc. It was, in fact, an entirely fresh field for all the 'ologies.

The third member of the expedition's original nucleus was Dr. K. S. Sandford of Oxford University, who for several years previously had been engaged on a palæolithic and geological survey of the Nile Valley from the Second Cataract to the sea, on behalf of the Oriental Institute of the University of Chicago.

Newbold could not come. It was a great disappointment both to him and to us: to us because he had done so much last time to make things go with a swing and to keep people amused and confident when the outlook appeared gloomy: to him because for years he had been collecting information about the previous human history of the desert from ancient times onwards—from the guarded conclusions of archæologists, from the old Greek writers, from the books of Arab travellers, from first-hand stories told to him by the bedouin and from the present racial make-up and customs of the Sudanese tribes. But his recent appointment as Governor of the great province of Kordofan now made it impossible for him to get away. When the final decision arrived he handed over all his files of notes for Shaw and myself to look through, with the sad remark that he didn't think now he would ever have another chance to go out and follow up his work.

In his stead, as our Sudan representative, came Major J. E. H. Boustead, M.C., commandant of the Sudan Camel Corps at El Obeid, bringing

with him a large collector's box and a shot-gun with which to secure specimens of the desert bird life. He was appointed hunter too, in the rather unlikely event of our finding any animals that might vary the diet of tinned food.

The War Office very kindly saw its way to allowing leave to four other officers besides myself; Craig, as navigator, surveyor and food controller; Lieut. D. R. Paterson, Royal Signals, as assistant to Shaw with astronomical work of position-finding, as chronometer time-keeper with the wireless receiver in the evenings, and as car driver by day; while Prendergast, who was still in Cairo, took charge with Lieut. R. N. Harding-Newman, Royal Tank Corps, of all the transport arrangements, including buying and fitting up of four Fords and selecting spare parts, tyres and tools, etc.

On all our expeditions up to now we had divided the whole cost equally between the members of the party, but with the buying of four new cars and petrol and food for some 6000 miles the cost was now somewhat higher than before. However, owing to the generous help both of the R.G.S., and of Dr. James Breasted of the Oriental Institute in America, our own share was reduced to a little more than half the total.

The externals of Cairo change very slowly, and the atmosphere changes not at all. There is a wonderful sense of permanence. A few buildings go up and more motors throng the streets, but the same bustle of native life goes on as it has always done. The curio vendors in their mellow-scented shops, the dragomen hanging round the European quarter, the hotel clerks, all those who preside over the tourist's life, have that impressive bedside air of ripe experience, of complete ability to satisfy the wants and credulity of all classes of their

customers, that comes only from administering to generations of sightseers through the ages. Their predecessors had looked after Herodotus long ago when he came to see the wonders of Egypt.

And so to-day Governments had come and gone; seeming momentous changes, the probability of riots and conspiracies, have been discussed by grave men at the Turf Club, but all the time the same placid officials and advisers have carried on patiently just as Lord Cromer taught them to do years ago.

And Cairo never forgets. The British Army is as welcome now as when the thought of the Dervish menace in the south sent shivers down its back. It is a good place to go back to—one of the few to which a departed resident, having remembered his stay with pleasure and a longing to return, comes back again to find the clothing of the old surroundings still fits without any disappointing gaps.

It was nearly five years since I had ceased to live in Cairo. The trees in the Mess garden which Bader and I had laid out when the new Mess was built were now mature, but the garden was the same, with the same rickety wooden garages in the corner under the eucalyptus trees, whence so many happy expeditions had started out.

The same hurried rounds of business followed our arrival: the kindly welcome with its little cup of office coffee and a keen discussion of plans at the Desert Survey (where Mr. G. W. Murray had by now taken Dr. Ball's place as director), the Frontiers Administration and other Government departments, the final arrangements at the Shell office about petrol, last-minute work at the body-builder's and at the Ford agent's, the checking of theodolites and aneroids, and finally the same self-conscious departure through the streets of

Cairo in our outlandishly fitted vehicles slung around with rifles and equipment.

And now, on September 27th, 1932, we were out in the desert once more, camping at the foot of a sand dune at the end of the first day's run, in that crisp Egyptian air that keeps one dry and active even in the hot September sun. We were free again to go anywhere we pleased, away from roads and hedges, from flies and traffic, with that happy sense of being the only things alive.

Often during the eighteen months of correspondence and negotiations which brought the expedition into being and slowly overcame obstacle after obstacle, had Shaw and I doubted whether it would ever really come off. It had been of just this evening moment that I had always dreamed—throwing oneself down on the sand, comfortably tired after the first day of unaccustomed cross-country driving, with a feeling of contented fulfilment that it had indeed come about.

The sun was setting cloudlessly below the dunes, drawing after it from the desert the daytime tints of brown and gold, just as one might pull a coloured gauze off a dull grey table. The thermometer fell as one watched it, degree by degree with the falling sun, till with a conscious message of relief the body suddenly switched off its cooling mechanism, closed its pores and presently complained that the day's debris of powdered salt crystals had not yet been wiped off its face.

Then someone broke the stillness by getting up to start the evening work. You could hear his movements sharp against the dead background of the desert silence, like short bursts of clatter in a kitchen late at night. He was drawing the evening ration of water with a rubber syphon from one of the two-gallon tins on the running boards. It was the first day out, so probably he would pick

on a tin that had been on the sunny side of the car all the afternoon, and the water would be warm. Craig would be issuing a tot of whisky very soon. You stretched and got up. The sand was already cold under your bare feet.

The dusk had hardly set in when a distant hum announced the arrival of Penderel in one of his troop-carrying machines from Heliopolis. He had half promised us a farewell visit this first day when we were still within easy reach, but we had given him up by now, thinking he must miss our tracks in the dusk and that in any case it was too late for him to get back by daylight. But he was circling round broodily, like a dog before lying down. He was going to land. Three of us ran out, as had been arranged, standing in line to give the direction of the wind and to mark a safe landing-place.

The huge craft came quietly to earth, and drove across the sand to our camp. They were going to spend the night out.

Penderel entertained on a generous scale. There would be no water ration to-night, for an immense ice-chest was lowered out by the combined efforts of the crew, with a complete cocktail bar inside, and quantities of beer. There followed tables, armchairs, a gramophone and a dinner of many courses for the whole party of fourteen. It was a great thought, and very much appreciated. Never can an expedition have had such a send-off after it had once started out.

Early next morning we parted, Penderel for Cairo and ourselves south-west towards Kharga. It would certainly have been quicker had we gone there by the direct road along the Nile to Asyut and thence down the Arba'in, but as the country due north of the Kharga depression was not known, a detour was made as far west as the Abu Moharik dune line to go and look at it.

It was a pity, for we met serious trouble there with a bare surface of hard grey limestone scored by the wind into grooves, as if a giant had run his fingers through a plain of moist clay, leaving jagged ridges twenty feet high. The lanes between led us, just as the dunes in the Sand Sea had done, in a direction we wanted to avoid—straight on to the brink of the 800-foot cliffs above the depression. I thought each minute one of the cars would break in half as we worked our way back along the top of the cliffs; the country was worse than any over which I had taken a car before.

After even a short lapse of time one loses the knack of driving a car over obstacles. Probably if this country had come at the end of the journey instead of at the beginning we should have done better. As it was, chiefly through forgetting to keep the tyres pumped very hard, the covers of a good many were burst before the only pass down the cliffs was reached.

At Kharga Penderel paid us another visit, bringing out four new tyres for which we had telegraphed on arrival in the oasis. He, it now transpired, was also intent on reaching 'Uweinât, and had brought with him a quantity of petrol with which to make the first of several preliminary dumps. There is a small marked-out landing-ground at Kharga used occasionally by the R.A.F., but no one had been out by air beyond this into the desert except Penderel, who had flown to the Gilf Kebir the previous spring in Robert Clayton's Moth.

Our own party left Kharga on 2nd October for the south-west. Every twenty-five miles, if there happened to be a suitable flat patch of sand, the cars were driven round on it in a figure-of-eight in order to mark out a possible landing-ground for the R.A.F. Later in the morning

Penderel followed, but on seeing us went back again without landing. He was testing the chances of being able to use our tracks to show him the way.

It is a terribly difficult feat, as poor Robert Clayton found, to follow a winding car track from the air. The thin marks are faint and very hard to see in the glare, wriggling from side to side, at one moment away to a flank almost out of sight, darting in suddenly underneath the machine, dodging the next moment round a tiny hill with hard ground where the tracks are lost.

One of the joys of travel is the finding of unusual, of unexpected things; and here, in crossing this country which has been lifeless for thousands of years, the exciting thing for which one searches eagerly, whose anticipated finding keys one up throughout the day, is some sign of former human life.

It was not lacking. We seldom drove fifty miles without finding some human relics, and one never knew what would come next, for they ranged in date over a large period of man's existence on the earth.

In living countries the soil gradually rises, covering up the remains of former times, sorting out the past into an ordered series of layers through which the archæologist has to dig for what he wants. Here in the Libyan Desert the surface is itself the bottom of things, on to which all remains of former men, their tools and pottery, have been lowered through the removal of the old accumulated soil. Everything lies exposed on the top, the bones and weapons of a lost Arab who had lately wandered out and died, alongside the tools of some palæolithic hunter of twenty thousand years ago.

I doubt who got the greatest thrill from these finds, the experts or the laymen of the party—perhaps the latter, for it was all new to us; the oldest stone implements are difficult to spot among the other stones, and till Sandford showed us what to look for, most of us had never thought to look at all.

Sometimes in a hollow we would come upon a little pillar which looked to us just like any other eroded rock; but Sandford would have us stop while he investigated. It was a lump of old dry mud, the remains of a mud-pan which had once filled the hollow. Then he walked away to the edge of the hollow and there began to pick up all sorts of treasures—stone tools and grinders which we would have passed by unnoticed.

High rocks with their sides not yet so badly eroded away that they ceased to cast a shadow at noon, formed another likely class of place whereat to find things. In the open desert such rocks are very rare, so rare that to see one may be the great event of the day. They can generally be spotted from a long way off as a lump of blackness in the glaring sand. They attract all forms of life—everything goes to them seeking shelter from the sun.

One such rock due south of Dakhla thus attracted us. Under it was a snake engaged in swallowing a small bird, and under it also we found the whole equipment of some unfortunate man, spears, sword, shoes and clothing, left there evidently before he made a last desperate effort to reach water. A day's march to the north on our return journey two months later we came upon a skeleton. Possibly these remains belonged to one of the Kufra refugees, but equally likely to some Dervish of last century. These things are impossible to date. The effects of the driving sand are unaccountable.

At other places, as at Burg el Tuyur, these solitary bits of shade contain pictures scratched or painted on the rock, showing that the old people went to them and loitered there just as do the wanderers of to-day.

We reached the foot of Kissu on October 5th after a total run of 800 miles from Cairo. Again, as in 1930, we did not know in the least what the situation was over at the pools of 'Uweinat twenty miles away. A gang of Guraan raiders led by one Gongoi had been active lately both in French territory and in the inhabited Sudan farther south. Their present whereabouts was unknown, and it was quite possible they were here. Moreover, the large and well-armed party of Kufra refugees who had gone off towards Merga Oasis in 1931 were still not accounted for, but there was evidence that it had joined forces with the Guraan. Kissu, being waterless and an utterly barren peak, seemed therefore to be a much safer place to make our base.

After dumping all our belongings there we drove across to 'Ain Duwa, the western of the two waters of 'Uweinat. It is easily got at by car, lying actually on the level of the plain, surrounded by the rounded granite boulders above which the mountain side rises abruptly. (Indeed the pool is below the general level of the country round, for the mountain rises from the middle of a wide saucer, so that the drainage from it hangs around the base without flowing away, quickly drying from the surface, but leaving a residue underneath which keeps the shady pool filled for years afterwards.)

We approached the place cautiously, one car in front and the other three supporting it fan-wise with loaded rifles ready to reply to the first shot.

Everything looks so close at 'Uweinat: one could even see the individual rounded stones piled one on the other in the tumble at the cliff's foot. The foreground of smooth plain gave no hint of distance. We drove on and on without seeming to get any nearer, till at close range the stones each became a boulder twenty feet in height, making the mountain in proportion grow suddenly to ten times its former size.

There was no one there. The whole place was very dry, even drier than it had been two years before; there had still been no rain at 'Uweinat. Out on the plain we had passed a desiccated camel several years old, whose body looked as if it merely required water to revive, like a Japanese dried flower in a bowl. So little flesh was left to die here now, that the jackals and vultures had long since gone away. The only sign of life was a green scum floating on the surface of the semi-underground pool.

From here the plan was to make a big circuit westward, limited in length only by the supplies the cars could carry; that is, about 1200 miles. Then, skirting the outward-jutting corner of the Erdi plateau, we would wander south, zigzagging across the unexplored desert areas towards El Fasher, where further supplies could be got for our return journey back to Egypt. As it was impossible to tell what detours might be necessary to reach El Fasher, this southward lap meant that a further maximum load of petrol would be needed, making enough for 2400 miles in all.

Unlike any previous expedition, our movements were almost unrestricted by considerations of supplies. We could go wherever we liked. Neither water nor petrol tied us to any particular route or to any well, for we carried everything on board. Even Prince Kemal el Din, owing to the great

petrol consumption of his fleet of caterpillars, had been dependent on his supporting camel convoys, and had to go more or less from well to well, his longest run away from water being the 500-mile triangle from 'Uweinat to the French border at Beacon Point and to Merga. Apart from unforeseen breakdowns or a battle with the Guraan, the only things that might stop us were mountains, rocky country and the worst kind of dune-fields.

The trip to El Fasher presented an interesting problem in transportation. The two obvious jumping-off places near the Nile, where petrol, etc., could be made available, were Kharga with its railway, and Selima to which stores could be sent by camel from Wadi Halfa. From Kharga 'Uweinat was 450 miles away and from Selima 300. There was no chance of arranging a dump at 'Uweinat in advance. It was practically out of range of camel caravans, and to send several tons of petrol out by hired lorry would entail far greater expense than we could possibly afford. Besides, both methods would require one of us to go out with the convoy to ensure that it got there, and no-one could have got away so long ahead. It had been hard enough in any case to extract the various members of the party from their jobs for the actual expedition.

After leaving these two oases for the last time, therefore, we had to rely on our own resources for a distance of nearly 3000 miles.

Petrol, of course, was the main item. Reckoned at the safe rate of cross-country consumption of 12 miles per gallon per car, we had to collect a dump at 'Uweinat of 800 gallons. But in addition to this, food for six weeks had to be carried out from Cairo, not to mention a heavy load of instruments, spare parts including springs and even spare members of the main chassis frames, tools and

tyres, rifles, ammunition and a box of Mills bombs in case of trouble. The cars consisted of the ordinary touring car chassis with box-bodies added. They were unstrengthened except for two extra leaves in the back springs, but could carry a load of 1750 lbs. each with safety over reasonably good country.

Everything except the petrol was taken out with us via Kharga and dumped at the camp beneath the peak of Kissu. Meanwhile Shell had enterprisingly undertaken with the help of the Governor of Halfa Province to send out a camel convoy from Wadi Halfa to Selima Oasis with 960 gallons of petrol and oil—over $3\frac{1}{2}$ tons in weight—which would be left there under a police patrol until we came to collect it. We could just manage to remove this load to 'Uweinat by making two journeys in three otherwise empty cars.

On the 8th October the first party-were on their way to Selima by the shortest route, having started the evening before—Boustead and I in turn driving and navigating the first car, with Paterson and Harding-Newman following, each with his own empty car.

The direct route, which no one had tried before, appears to cross the great Selima—Terfawi sand-sheet at its widest. It began after a hundred miles of awkward gneiss and quartzite outcrops had faded out, and lasted to within fifty miles of Selima. For most of the way a hot blast of driving sand was sweeping over the surface from the north, making things a little unpleasant, so that we had to wrap our faces up with bits of cloth. There was nothing whatever, not a pebble, to look at. We drove for hour after hour, often at 40 m.p.h.

It was a curious experience. Our one thought

was to keep awake and to keep the thin shadow on the dial of the sun-compass on the arrow that marked the set course, for I knew the little oasis would be difficult to find and so was anxious to hit it off exactly. For comparison it was like starting from Newcastle on a compass bearing and trying to find a small garden somewhere in a vague rocky depression which was the size of London and the same distance away. The two drivers behind, each following the endless unrolling of the twin tracks of the car in front, must have felt like the traditional hypnotised hen with its beak on a straight chalk mark. Once Paterson did actually fall asleep. His car was last of the three. Harding-Newman just in front, catching sight of his car swaying slowly from side to side, watched him over his shoulder. At last he cast off the spell of the tracks altogether and went off on his own into the mirage with Harding-Newman luckily in pursuit.

This is the biggest sand-sheet so far known, having an area of more than 20,000 square miles. These sand-sheets have features quite distinct from the pleasing variety of the normal rough undulating or hilly desert surrounding them. The sand on them is not necessarily thick and is often a mere sprinkling. Sandford suggests they are the oldest bits of desert, centres, as it were, from which the disease of barrenness slowly spread—so old that every stone and knoll has been eroded away—the last state of the world, to which weathering can do no more. They were the one type of place on which we never found a single palæolithic implement, so that they were probably uninhabitable even long ago when the rest of the country was green and populated.

The first sign of the Selima neighbourhood was

a group of very old camel skeletons. Then rocks appeared, and the land became more and more broken as we sank into the depression.

I had set the course so as to approach the oasis from the south-west as we had done in 1930, to give me the best chance of recognising something on the way in. But it was all unfamiliar now; nothing fitted in with my memory of our previous approach. Our plotted position made Selima eight to ten miles to the north-east, but on so long a run we might easily be miles in error. It was evening, so we camped. A couple of latitudes were taken, but both Paterson and I were very tired, and the results differed ridiculously.

In the half darkness next morning only the vague outlines of near-by hillocks were visible. The wind came gently from the north-east, and I was distinctly aware of camels. The police patrol with their camels should be waiting for us at the oasis and there was no real possibility of there being anyone else about between here and the Nile, so I decided to trust to my dead-reckoning position and to drive towards the smell even though the country looked strange. After a few miles I spotted the immediate surroundings of the oasis straight ahead, and we reached the little palm grove to find the police waiting for us with their camels, and the petrol cases neatly stored in rows. The oasis was a good ten miles from our night's camp. Still, I don't think that smell can have been imagination, for two of the other three smelt it as well; after all, our noses had been starved of smells for some time now, and were probably very sensitive.

That dump of petrol looked enormous. It seemed impossible that our three small cars could take away half of it. But Prendergast had de-

signed the box-bodies for just this occasion, and we had calculated out the weights very carefully. Each car took its twenty eight-gallon wooden cases with no extra space to spare, and staggered off.

During the three days we were away the others left at 'Uweinat had been busy. Leaving Kissu on the morning of our departure they had driven round the eastern corner of 'Uweinat and northwards towards the Gilf to visit a group of crater-like objects which Almasy's party had seen from the air the year before but had not investigated from the ground. Here a day was given up to Sandford's geologising, for they were true craters of a volcanic eruption which had burst up through the sandstone some time not long before man began to leave his tools about the country.

On the way back Penderel's aeroplane was sighted. As there happened to be a possible landing-place near by he was signalled to with a mirror flashing in the sun and came down to talk for a short time before returning to his camp away back half-way to Kharga.

The trick in signalling with a hand mirror is to ensure that the flash is directed at the aeroplane. To do this, the mirror must be pointed downward so that the spot of sunlight appears on the ground just in front. The mirror is then carefully tilted up so that the spot moves away along the ground in the line of the aeroplane, and finally rises up well past it. The mirror should then be tilted up and down in this plane, so that the flash strikes the aeroplane repeatedly.

This was the first time any service machine had reached 'Uweinat from Egypt. It had been by no means an easy business, having necessitated several journeys to and fro to bring out sufficient petrol

stage by stage. It had taken Penderel about as long as it had taken us. He had been unable to follow our tracks for very far, so had come on by compass till he sighted the cliffs of the Gilf Kebir, which he recognised from his former jaunt with Almasy.

On the 7th and 8th October the same party—Craig, Shaw, Sandford and Prendergast—had worked round the south side of the mountain from east to west, Sandford hammering rocks and Shaw botanising among the few dry but still living bushes in the deeper valleys. The place was deserted now. They had it all to themselves.

On reaching 'Ain Duwa, however, Major Rolle appeared, to their great surprise, and invited them all to lunch. He and Lieut. San Severino of the Italian Royal Air Force had just arrived from Kufra by lorry with a patrol consisting of thirty native troops, a mobile wireless station, lorry drivers and mechanics. They were comfortably encamped in tents around the pool. Soon afterwards, too, Colonel Lordi arrived on the scene with two Italian military aeroplanes.

It was a situation at which I am sure the Italians were as much amused as we. Here were two parties, the one uniformed and undeniably official and the other composed of army officers though in nothing but their beards, shorts and ragged shirts; both confidently within their own rights yet occupying territory which the other party showed on their maps as theirs. For though the south and western boundaries of Egypt had long been settled to everybody's satisfaction, the southern frontier of Libya had never been discussed, and the lone mountain of 'Uweinat, undiscovered prior to 1923, lay by a quaint coincidence exactly on the corner with the water pool of 'Ain Duwa in the doubtful country. Both sides left the subject of ownership severely alone, nor were any questions



LIBYAN DESERT, SHOWING ROUTE OF 1932 EXPEDITION

asked as to either party's reasons for being here, or of their future intentions.¹

After a cheerful tea-party in Rolle's tent our people returned to Kissu, where they found us just arrived with the first load of petrol from Selima. That evening Penderel turned up again, at dusk, as his custom was. A figure-of-eight had already been marked out with cars to show him where to land, and as before he taxied up to our camp for the night. Never as yet had these far-away mountains received such a large and distinguished population—representatives of the armies and air forces of Britain and Italy, and of the Universities of Oxford and Chicago!

Next morning, after an early visit from Lordi and San Severino, who came flying round Kissu, Penderel, shaved and transformed once more into an officer of His Majesty's Service, took off to pay an official visit to the Italians. Craig, Prendergast, Harding-Newman and Sandford departed too, to Selima for more petrol, leaving the remaining four of us to ourselves, to carry out two projects which former visitors had omitted.

The first of these, an expedition up a deep cleft in the southern side of Kissu which we had seen in 1930, was accomplished in a morning. There had been a chance that it might contain rock pictures or other archæology, but although evidence abounded of heavy mountain torrents not many years ago, no signs of occupation could be found, except the old and indistinct traces of

¹ The north-western boundary of the Anglo-Egyptian Sudan was finally settled in July 1934, Great Britain and Egypt renouncing all claim to the Sarra Triangle in favour of Italy. The Sudan-Libyan frontier now runs from 'Uweinat due south along Long. 25 as far as Lat. 20; thence west to Long. 24, and south again to meet the existing Franco-Sudanese frontier at Beacon Point. Italy renounces all claim to country east and south of this new frontier.

some large animal in the sandy drifts among the boulders.

The other was a more serious task, which Shaw and I had determined to achieve before leaving the place: that was to reach the highest point of the 'Uweinat massif. We had tried before and failed through under-estimating the size of the mountain, the dryness of the air and the heat. We had then taken only two pints of water between us for the day. This time a start was made in the evening, after a lazy morning at 'Ain Duwa washing, mending clothes and chatting to the Italians. We had reconnoitred the best way up with glasses from far out in the southern plain, and in the afternoon had pushed the car to within five or six miles of the main cliffs as far as we could get it in among the foot-hills and spurs. The route had seemed perfectly straightforward, up the screes connecting a very conspicuous semi-detached triple peak to the main block of the massif, and from there up through a crack in the cliffs on to the rounded dome behind.

Though a bright moon shone out at intervals, the local sky above the mountain was thickly overcast as if, by a miracle, it might rain. All went well at first. The light was just enough to see where to put one's feet among the rocks. Two rucksacks, one containing a two-gallon petrol tin of water and the other our food and four two-pint water bottles, were carried by each of the four of us in turn in half-hourly spells.

The ground rose steadily. We climbed for two hours, only to find at our feet a gulf between us and the mountain, with a gleam of pale moonlit sand at the bottom; all our height was lost. From below, after a long scramble down the steep loose rocks, the triple peak for which we aimed was

now out of sight, but the black mouth of a gorge led apparently in the right direction.

Almost at once the sandy floor narrowed, becoming choked with round water-worn boulders thirty feet across, so we worked along a vague wild-sheep track, edging along the easier-looking of the thousand-foot sides. That gorge seemed interminable. Far up above, the walls steepened near the skyline to an unbroken rim of overhanging sandstone. The air was hot and heavy, with no breath of breeze. We groped our way in the darkness over the huge rocks still hot from the day before, each footstep echoing up again from the blackness down below. The only other sound came from the water tank on someone's back—a continuous wet gurgle suggesting thirst.

At last the triple peak appeared again against the sky, but away on the other side; we had unknowingly swung round in the dark. There was no alternative now but to descend to the bottom once more and climb up again.

At 2.30 a.m. we finally reached the crest-line up a little chimney in the uppermost wall of rock, and found ourselves, now without a doubt, at the foot of the main screes below our triple peak, about 1500 feet up, with another 3000 feet to climb.

Here after two hours' sleep, dumping the precious water tin by a conspicuous rock for the return journey in the heat of the day, we went on upwards with a water bottle each. It was easier going now. We could see, and were in the open air once more, with the cheer of an occasional puff of wind; but all the same, climbing in the Libyan Desert with a perpetual thirst is a very different proposition to a jaunt in Switzerland, where a mere rock scramble of 5000 feet would

be but a morning's exercise. A hot dry mountain requires many times more vigour than a cold one.

The crack we had noticed in the main cliffs was reached without much trouble up a 2000-foot tumble of broken rock. But the vertical erosion inside was even worse here than where Shaw and I had seen it ten miles away near Karkur Murr. The place reminded one of the ruinous pillared halls of Karnak on a still bigger scale: it was a maze of tottering pillars fifty to a hundred feet high with narrow winding passages between, some choked by fallen pillars, some ending abruptly to start again at a higher level, some twisting round and disappearing into dark caves and cracks. Near their tops the pillars were eroded horizontally into the grotesque outlines of statues with heads and necks. Often the necks were cut through by the weather, leaving the huge loose heads tilted sideways leering at us.

The final dome of normal solid rock was reached at 9 a.m. and half an hour later we were at the top, a flat platform some half-mile square, at the north-western corner of which we built a cairn of stones, hoping that it might serve as a triangulation point for any future survey work, and so save someone else the labour of a second climb.

The rock screes were much more difficult going down. Indian sandals with open toes and heels through which one can kick the accumulated sand and stones are good for the crumbly Frontier hills and ideal for the sandy desert, but for screes of tilting sandstone slabs that come up and hit one's bare ankle-bone they are not a great success. Most of our foot-wear came to bits on that descent, except Shaw's; he believed in boots and leggings. The soles of Boustead's light shoes came off altogether. Shaw, though happy in his

feet, had a poisoned finger we had done surgical operations on only the day before, and constant collisions against rocks worried it unmercifully. It was a very lame and very thirsty party that reached the water tin half-way down. We had been thinking of the tin all the morning, and both Shaw and I, with memories of our attempt two years before, had had visions of not being able to find it.

The whole trip took just twenty-four hours. We were back again at the car shortly after dark, drinking tea and rum, with the comfortable feeling of achievement that comes of being the first to reach however small a mountain summit. There had been nothing there. I am not sure what we expected to find. But one never knows. It would have been a pity to have left the mountain still unclimbed.

With the return of Craig's party from Selima, the dump at Kissu was complete. A hundred gallons of petrol were now loaded on to each of the four cars; after taking on a supply of water at 'Ain Duwa, the whole party left for Sarra and the west on the afternoon of October 13th. The Italian patrol was still sitting at 'Ain Duwa; Rolle evidently had no intention of losing track of our movements, and San Severino even talked of flying to visit us at Sarra.

In the northern desert, as we have seen, the wind has combed out the dunes into straight ranges running roughly S.S.E., but as one goes south the direction of the prevailing wind gradually shifts from north-west to north-east, and in consequence the whole dune system of the Libyan Desert makes a vast wheel round. Centring on a point somewhere near Kufra, the direction of the dune ranges swings through a complete right

angle till the parallel ranges west of 'Uweināt are pointing south-west instead of south-east. Near the centre, between 'Uweināt and Kufra, the change is very sudden, a space of less than 200 miles separating the long straight dunes of the northern Sand Sea from those of a new system at right angles to them lying to the south-west of 'Uweināt. Farther out, near the Nile, the dunes where they occur lie in arcs of greater and greater circles 300 to 500 miles in radius.

This second big dune-field was discovered by Prince Kemal el Din, who crossed it diagonally on his way to Sarra in 1926. The dune ranges are of much the same type as those in the Sand Sea, but are lower, more open, with more and wider strips of rock between them. The whole extent of this field is still undefined; as a result of this trip of ours alone its known size was nearly doubled.

The prince had had difficulty in crossing some sections of the dunes and had carefully mapped the crossing-places he had ultimately found; so, to save unnecessary labour, we kept to his tracks wherever they could be seen. They were clear enough over gravel where the tyres, pushing aside the stones, had left permanent grooves, but across flats of sand whose particles were small enough to be displaced by the bombardment of grains falling from the flying sand-blast, they were very indistinct; and over mobile wind-carried dune sand there were, of course, no signs of them at all. But often, long after they had faded out, one could still follow them; for every time the wheels crossed the old grooves of disturbed sand, now completely hidden under a fresh deposit, a little pull was transmitted to the steering-wheel, just strong enough to remind one of crossing tramlines in the dark. It gave one a queer feeling that Kemal

el Din's ghost was travelling with us, helping with a feeble hand to guide us along his old tracks.

At Sarra Well another surprise awaited us. More Italian tents were pitched, another little row of lorries and another wireless mast! A patrol from Kufra had been sent here too, to meet us.

It being only midday we had intended merely to stop for lunch and to push on westward, for there is nothing more to be seen at Sarra than a well-mouth in flat open sand, surmounted by the rough wood beam and pulley left by the Senussi when the well was dug. The water level being nearly 200 feet underground there is not a scrap of vegetation to be found.

Italian hospitality, however, made us stay a night at Sarra. Major Lorenzini would not hear of our going away. He was all by himself and we must dine with him. Boustead had shot two gazelle near 'Uweinat, and as we still had a good deal of their somewhat tough meat left, an attempt was made to pool our food resources. But Lorenzini insisted on supplying the whole of that dinner. Little had we thought to have sat down at a table at Sarra Well, to eat roast chicken and spaghetti in front of many bottles of excellent Chianti, or to have delivered after-dinner speeches under the stars, standing over a white table-cloth wishing each other success in sparkling wine. We understood each other; both Lorenzini and we had lost our hearts to this great desert, both sides were at home anywhere in it with a few cars, and both longed for still further corners of it to explore. He had served in the Libyan colony for fourteen years.

A long line of dunes runs from Kufra along the western side of the caravan route to Tekro, forming a barrier whose outlines can be clearly

seen from Sarra. No one had ever crossed it, and nothing was known of the country beyond, between Sarra and the mountains of Tibesti. The crossing of this barrier took us the best part of a morning, for it proved to be a full twelve miles in thickness, composed of many dune ranges one behind the other. To the west of it we entered a most dismal region,—of coaly black plateaux strewn with broken slabs of very hard silicified sandstone, of long escarpments indented by black-cliffed gulfs, of formidable sand dune ranges and jagged rock outcrops. The remains of human occupation in some past fertile age—implements, stone circles and vague cairns amongst the wildest rocks—only served to emphasise the utter barrenness of the present surface.

The going became so bad that I began to be anxious for the cars, for we were 900 miles from anywhere where replacements could be got. The farther we went the worse the ground became. Loosely balanced slabs weighing half a hundred-weight or so, tipped up by the sudden pressure of the wheels upon them, would come flying back to hit the wire spokes with an alarming thud. Several spokes were broken in this way and many more were badly bent. While sliding down a cliff-side a projecting rock carried away my exhaust pipe. Soon afterwards a serious crack appeared in one of the main engine-supporting brackets of another car. We had no spare bracket, so Prendergast and Harding-Newman spent most of one night changing the brackets over left and right to relieve the tension on the crack. It was really bad country for cars. The stretches of flat hard sand were even worse than the rocks, being corrugated into foot-high waves, almost invisible from the windward direction, which shook and twisted every portion of the chassis.

We were now heading south-eastwards towards

the French well of Tekro, with the 10,000-foot peaks of Tibesti sticking up along the horizon on our right. The problem of finding a stretch of less rocky country to travel over became more and more urgent.

Within limits it didn't matter where we went as long as we got away from this inferno of rocks on to some surface where wheels would run. But in this flat or nearly flat wilderness of rocky ridges one could see nothing, and it seemed impossible to tell what the country might be like elsewhere. A change of course might take one into a still worse tangle of rocks.

It was here that the geologist intervened. Sandford, a little shyly, began to take control of our course. He had all the exposed strata of the tilted sandstone charted in his mind, and was able to predict just when the softer, more reasonable, ledges would be found. It was magical. He led us ten miles farther east to a land neither he nor anyone else had ever seen, and there sure enough the hard jagged rock ceased, giving place to smooth comfortable plains that dropped gradually downwards into the hollow in which Tekro lies.

This place is a little uninhabited oasis consisting of a shallow well of sulphurous water and some bushes growing among high mounds of sand. Though the first villages of Equatoria lie much farther to the south-west, Tekro is important as being the last well on the road to Sarra and Kufra before the long desert stretch begins.

It is the outermost water-hole of the inhabited and surveyed region beyond the desert. With our arrival at Tekro, therefore, the Libyan Desert had been crossed for the first time east and west.

It remained for us to try a direct route back to 'Uweinat before our petrol ran out. 'Uweinat

mountain had by now become in our minds a sort of home, a base where further supplies of life's necessities awaited us. Such is progress. Not long ago it had been at the outer edge of things, an ultimate goal to be attained.

Little difficulty had been anticipated over this return journey. From previous experience the direction could be foretold of any dune range we might encounter, and as this direction would coincide with our own route, few, if any, ranges need be crossed. The actual surface proved to be even easier than we had thought. It was either flat smooth sand-sheet or rolling sand billows between the ranges of a new and unmapped dune-field. The few difficulties we had arose from an unexpected cause.

On both the previous journeys across the great dunes in the north there had been found, lying high up on the blown sand surface, rough stones whose presence far above the rock floor was inexplicable unless they had been carried there by man. De Lancey-Forth's finds of ostrich egg and stone implements may also be recalled. In this new dune-field the sandy hollows were littered not only with rough stones but with a profusion both of flaked implements and grinders left at some unknown date by a large and long-continued settlement of men.

Whether it was that the pure sand grains were still contaminated by the dusty refuse of the old men who once lived on these sites, or because the stones, projecting above the smooth surface of the sand, ruffle the gliding wind and so prevent it from bedding the dune grains firmly into place, but in each successive Stone Age site the cars all sank into unusually soft sand, and there stuck firmly.

It seems to be more than a coincidence that these sites were always associated with the dunes.

They were not found away from the actual mobile sand, and yet the dunes showed no signs of encroachment upon them. One gained the impression that the dunes and the human settlements between them were somehow linked with one another, as if it were on the dunes themselves that the people depended for their crops.

Who were these People of the Dunes, when they lived, and what it was they ground with their countless grinders, is still a complete mystery. To-day the nearest blade of herbage is hundreds of miles away. The place is utterly devoid of life. Not the least intriguing aspect of the problem is that there are in use to-day, around the fringes of the desert, grinders which seem identical with the ones found here associated with the tools of Stone Age man.

CHAPTER X

SIX THOUSAND MILES (*continued*)

THE party left 'Uweinat for the last time on October 23rd, carrying a record load—enough petrol for 1400 to 1500 miles, food for three weeks and water for eighteen days.

The distance to El Fasher is only 600 miles in a straight line, but we had less idea than ever before of what hazards might have to be avoided on the way. Wise men had foretold that masses of tumbled sand would be found piled up against the high ground along the French frontier by the prevailing N.E. wind. The only direct information we had about this was a gloomy report by a boundary commission who had worked up the border for a little way from the Fasher end; they said that the sand got worse and softer the farther north they went. That report might be true, or it might be merely an opinion fostered by the long persisting idea held by Europeans that soft sand was uncrossable. Again, it was possible that rocky spurs from the French highlands might jut out into the desert to bar the way.

There was another hazard too that increased our caution. For many years, perhaps for centuries, raids had been made by the black Tebu hillmen of the western highlands into nearly every region bordering on the South Libyan Desert. Their movements were unknown. They operated in places as far apart as the Nile Valley and French Equatoria, Darfur and the oases on the Arba'in Road. How they operated across such vast distances of desert

no one could tell. The raiding parties were small and extraordinarily mobile; their seeming indifference to water supplies undoubtedly stimulated the general belief in the existence of undiscovered wells away out in the desert. Along the Nile they had become a legend; it was said their camels made no marks on the sand, that they lived on snakes and drank the liquid from their camels' bellies. Camels and girls would disappear in the night and were never retrieved, caravans were attacked, their men killed or robbed, but the robbers were never caught.

The evidence of recent years pointed to one small band of a few daring Guraan tribesmen led by three brothers of whom Gongoi was the chief. Their home appeared to be the plateau of Erdi, the Mourdi Depression directly to the south of it, and the eastern slopes of Ennedi immediately to the south of that again. The French, however, in whose territory these places lay, were, as was only natural, insistent that their home was the Oasis of Merga and that of an unknown Oyo, well within the Anglo-Egyptian Sudan. It was probably fear of this same band that had made the people of Kufra so reluctant to accompany Hassanein to Erdi Well in 1923.

During 1931 two raids had taken place. The first was a spectacular affair at Bir Natrun in which a caravan of Arabs come to gather salt at the oasis was attacked and robbed by a combined force of Libyan Arabs and Guraan, armed with modern rifles. The account was at first much exaggerated, the attackers being reported to have carried field-glasses, to have advanced from trenches and given orders by whistle! But it was the first evidence that the Kufra refugees who had disappeared from 'Uweinat towards Merga had joined forces with the Guraan. As a sequel to this a motor machine-gun battery accompanied by aeroplanes was sent out to

Bir Natrun by the Sudan Government to try and intercept the raiders, but it was too late; they had disappeared. A few months later another raid took place in French territory 250 miles away, and two more had already occurred in 1932 near the French border along our proposed route to Fasher.

A roundabout journey of 260 miles, over sheets of flat sand, across lines of dunes and boulder-strewn plateaux brought us on the evening of the 25th to the edge of the cliffs overlooking the head of the Mourdi Depression, a cleft which runs, not eastwards as one would suppose from the hills behind, but westwards down through them into the main hollow of Chad, between cliffs at the foot of which are wells and considerable grazing.

Of all the possible lairs where Gongoi's band might be harbouring, this depression was the most likely. Two natives we had met at Tekro had told us he was here, and according to reports his wife belonged to the particular tribe which occupied the lower and fertile portion of the valley.

Looking back on it now I suppose there was really very little risk of trouble, but we took Gongoi quite seriously at the time; the more so perhaps since the Sudan officials had recommended our mounting machine-guns on the cars! The only real danger lay in a chance encounter by day in a narrow gorge, or in a surprise attack by night.

The party was in a warlike mood that evening. We drew the cars up into a square, leaving gaps at the corners, at each of which two men slept with Mills bombs and loaded rifles ready by their sides hidden amongst their blankets, while an armed sentry kept a look-out over the cars from the inside. Had an attack taken place it would most probably

have been beaten off with ease, but our party certainly seemed smaller than it had done before, and an immense distance away from help.

Next morning the cars were slid down the cliffs over a convenient ramp of sand-drift into the broad sandy floor of the valley, along which we ran westwards for some miles, downhill towards French territory, with the cliffs of Erdi on the north rising higher and higher as we descended.

Signs of life appeared. Small hoof-marks as of grazing donkeys wandered hither and thither across the sand. If one looked low along the surface the faintest tinge of green was visible. Thin blades of a tiny herb were growing among the loose sand grains, not everywhere, but in patches as if some portions of the sand were less sterile than the rest. Here then for the first time after a journey of more than 3000 miles was real fresh rain-given vegetation.

We went on, not knowing what new thing would turn up next. A hot wind sprang up, driving sand grains in a moving carpet low over the surface. Then far off across the shimmering yellow ground something white seemed to flap about in the wind like the loose robe of a man, but the heat-streaming of the air destroyed all detail. We drove towards it faster and faster as it moved away. At last we began to overtake it. A large white hindquarters surmounted by two long straight horns was galloping clumsily in the soft sand. It was an addax antelope the size of a small cow, the rarest and shyest of game, never found except on the farthest fringes of desert vegetation. Gongoi was certainly not here; no footmarks of men or camels were to be seen anywhere in the valley, and the very presence of an addax proved definitely that the place was uninhabited.

One more visit was paid to this border country

in search of evidences of Gongoi's band. The Wadi Guroguro a hundred miles farther south was also said to be a favourite haunt of his; but Guroguro was empty too, save for the tracks of gazelle, antelope and ostrich. Considerable vegetation grows all along these uplands of the French border, but the country is rocky and almost impossible for cars. There are wells too, but they lie farther west among the hills. It was along them that Hassanein travelled to Fasher from Erdi.

That French country on the other side of the border had already been surveyed, and was to some small extent inhabited. We kept, therefore, on our journey southwards, mostly away out in the open desert in the east where no traveller had been before us. It was found to be a vast swell of undulating sandy billows of uncertain depth, whose loose grains a wind from the east was still blowing in a low cloud over the surface.

The open desert had up to now borne no life nor shown the slightest sign that rain had ever fallen. But we were now as far south as latitude 18 and were approaching the zone in which the Sudan's summer rainfall occasionally falls. Presently it was noticed that the car wheels were throwing up an unusual shower of sand as they went along. Stopping, we found the tyres studded with hard woody burrs having round flat heads the size of sixpenny-pieces, from which sharp prongs projected. They were lying about in the bare sand, prongs upwards, ready to stick into the feet of any animal that trod on them, quite dead and dry except for a tiny green root that grew downwards among the loose grains of the surface. These were the first living things. It seemed an odd way of heralding the approach of life—a sort of joke, as if a naughty child had scattered drawing-pins about.

After that more life began to dawn. The sand

was faintly green in patches as it had been at Mourdi among the highlands of Erdi. Here a sprinkling of rain had fallen a few months before. There were game tracks about, and addax were seen singly or in small groups of half a dozen, grazing in company with a few gazelle.

Slowly the herbage on the rolling sand thickened to small tussocks, in places years old and dead, in others, where rain had fallen the previous year, still just alive, and in others again fresh and green with this summer's rain. A little farther on oryx antelope with long horns curving backwards almost to their hind-quarters looked inquiringly at us as we passed. These oryx herds, again fraternising with gazelle, increased in numbers till the whole land seemed full of them. Meanwhile the addax had faded out, belonging only to the extreme limits of the vegetation where no other beast can live.

At latitude 17 a pair of ostriches stood in the sand looking at us before hurrying away with fifteen-foot strides. Soon flocks of fifty and a hundred birds could be seen among the herds of gazelle and antelope.

Probably no man in the lifetime of any of these animals had ever before intruded here; nor could any sign of beasts of prey be found. Independent of water, for they never drink throughout their lives, they wander for hundreds of miles over the sand downs, from patch to patch of herbage where it appears after a rare shower, grazing on it undisturbed. They know no enemies save the drought. Except for the timid addax that runs from anything at sight, they showed little alarm as we passed by. Gazelle, lying down chewing and lazily flapping their big ears, often refused to get up at all. It is a game paradise which one hopes no sportsman will ever disturb with car and gun.

Not far from latitude 16 the monotonous skyline

of rounded billows was broken by a clump of live green trees growing in the clean sand without undergrowth. Several ostriches were about; from beneath one tree a bird rose hurriedly and limped off, trailing a pretended broken wing to entice us away. A nest of 94 eggs lay there, arranged in a circle twelve feet across, with a central cluster of thirty or so. The combined weight of egg cannot have been far short of a quarter of a ton! I regret that, contrary to the laws of the country, we took one or two away for food, judging that they would hardly be missed among so many.

If a half-inch hole is bored in the thick shell with a brace and drill, the contents can be blown out into a cooking pot with the aid of a spare piece of petrol pipe, and then scrambled. One egg makes a good meal for eight people. Personally I liked ostrich egg well enough, but the others were, I think, prejudiced against it by the size.

A hundred miles farther south the country receives its summer rain almost annually. The desert was now at an end, though the land was still uninhabited and no wells existed. A change took place in the character of the ground too, for the billowy downs of loose blown sand grains gave place to geologically older sand bedded firmly with a deep red iron cement, relieved by rocky boulder-covered hills wherein water had worn the first real valleys we had seen.

Every type of country has its best means of transport. In the open rainless desert it is undoubtedly the motor-car; but where rain falls violently for a short period of the year and there are no roads or even tracks, the car has no place at all, and nothing but an animal will do. The next hundred miles through the sub-desert country before the first tribal tracks were found was something of a nightmare.

Steep-sided torrent beds wound through the dry mud of the valley floors, hidden from view by tall dead grasses. Low-branching trees barred the way, and logs lying in the grass jammed underneath the cars. We were not clad or equipped for this sort of country. Moreover, every living thing conspired to annoy. Falling with a crash over a foot-high cliff of hard mud into the soft sand of a hidden stream bed, a car would be unable to climb out. Directly one got down to take some action about it, curved cat-like claws which every tree and bush possesses tore at one's skin and clothes, while packets of tiny needles from the heskanit burr stuck into one's bare legs and bare sandalled feet. The air too in these treed valleys was far stuffier than in the open desert, and flies—the first we had known since leaving Cairo—buzzed savagely about our heads. And then, just as a car was finally extracted from a ditch, it would be found that the tyres were leaking slowly down, punctured in a dozen places by the broken invisible ends of spiky thorns.

But the continued advance of life was full of interest for all that. Baboons leaped high in the air out of the tall grass to see us as we ploughed through it. More and more different kinds of gazelle peered at us through the trees. Beaten tracks of men and cattle appeared fifty miles farther on, then two scared women in a hollow gathering grass seed for food. After that we passed in succession cows brooding over a muddy hole where water had lain a month before—more cattle among the trees—a village without a well (being supplied with water by donkey from twenty miles farther south still)—camels and donkeys winding in strings through the woods—men, partly Arab and partly Berber—a police patrol—and finally the outpost town of Kutum with a rest-house containing real

beds, and a gang of chained but grinning prisoners from the local jail to act as servants.

A motor track, newly made, runs from Kutum through the hills to meet the great east and west caravan road between Darfur and Wadai. By this, on the afternoon of November 3rd, we entered El Fasher.

Four very pleasant but busy days were spent at Fasher. It is now the headquarters of Darfur Province and was the former capital of Ali Dinar's kingdom. The British residents, officers of the Sudan Civil Service and of the Western Arab Corps, generously furnished the bare rest-house for us from their own bungalows, giving our somewhat large party their hospitality for meals and looking after all our wants.

As usual there was much work, and much hurry to get it done—the usual letters and telegrams to be dealt with, stores laid in for the very long return journey, cars to be overhauled and topographical detail transferred legibly from notebooks to the map. There were many little details too, all of which took time—shoes to be mended, beards and hair trimmed, clothes washed, tyres mended and specimens to be packed off to England via Khartoum.

These last occupied several heavy boxes and mostly contained stones. They included Sandford's geological specimens and Shaw's archæology. A large collectors' box went too, containing the results of Boustead's work—specimens of all the birds we had come across since leaving Cairo, temporarily preserved by injections of formalin. It was the first collection of birds ever made in the South Libyan Desert and provides, so the experts say, important evidence that a strong migration of palæarctic birds, falcons, swallows, pipits, wagtails and various

warblers, crosses the desert north and south on a broad front several hundred miles west of the Nile instead of keeping on the more obvious course along the river or the line of the oases.

Other collections sent home were those of insects by Prendergast and plants by Shaw. Collecting things in the desert, especially in soft sand where a halt may entail the subsequent extrication of two or three stuck cars by a perspiring party, is not an easy work. It calls for great strength of mind to spend a quarter of an hour looking for a stone implement, or pursuing a bird with a shot-gun, while the rest of the party wait, impatient to go on so that each may have time to hold up the party with their own collecting farther on.

In the intervals of our work we were entertained by the residents, who took us round Ali Dinar's queer old palace and harem, showed us the town, told stories of its history and explained its complex mixture of tribes and races. In no other primitive country administered by Europeans can one imagine such enthusiasm for the land and its people as is shown by the Sudan officials. The tribes and their customs and histories, are an absorbing hobby with them. The country is new, barely emerged from the barbarism in which the Mahdi and the Khalifa's empire left it, and the administrators still have all the interest of being builders and creators of a new State and historians of a hitherto unrecorded past.

In no other dependency, either, can one find such harmony between the people and their rulers. The Arabs say that God made the Sudan for a joke, with its terrible heat, its drought and sand, and its cruel barbed vegetation, and as a joke they make the best of it. The officials treat it in the same spirit too, preserving peace when tempers are running hot by keeping up the joke. Things work: the

people and their rulers combine to make it work: the government of this enormous country the size of Europe goes on smoothly, guided only by a handful of officials and a tiny army, because the people seem to be blessed with a sense of duty, and with that queer decent respect the English like, that can slap its ruler on the back, and call him bluntly by his plain untitled name without a trace of familiarity.

The common-sense politeness of the people, their spontaneous helpfulness and their restraint in the display of any curiosity that might annoy are amazing in comparison with the people of other countries. One can camp on the edge of a far-away village, where cars have never been seen before, and be left alone except for a courteous call from the headman to see if he can do anything to help. No children come to stare; no rows of curious adults squat among the trees to watch interminably, as they do in India. We met a boy of nine, who could never have seen a car before. He showed no surprise, but inquired at once, with the most natural question that comes to mind in that dry country, as to whether we wanted water. On another occasion a party of travellers with camels and goats stopped in order to help us pick heskanit burrs from our clothes, beards and faces.

The Gongoi question loomed large in Darfur just then, owing to the recent raids. The whereabouts of the combined Guraan and Northern Arab party was still not known, though the negative evidence we had brought down from the north-western border served to corroborate both the local rumours and certain information Rolle had given us at 'Uweinat, that they were lurking somewhere near Merga 400 miles away in the northern desert at the unknown Oyo. The latest rumour, many weeks

old, pointed to the probability of the two elements having quarrelled, the ill-fated Arab party being left stranded at Oyo, their camels and belongings having been removed by the wily Gongoi and his Guraan followers.

It was all very vague, though, owing to the time taken for reports of such remote events to filter down through the border tribes, and the Darfur Government was keen to know the truth. As it had been our intention in any case to return to Wadi Halfa through the Arba'in oases, it was decided that we should visit Merga on the way, and also if possible locate the elusive Oyo.

In view of possible further military patrols to that area being necessary later on, it was arranged that an officer of Boustead's Camel Corps should come with us, as none of them had been so far north before. Boustead himself had unfortunately to leave us at Fasher to put in a few months of hard work at El Obeid before going off to join Routledge's party in their attempt to climb Everest in the spring of 1933. To take his place Lieut. A. M. Finlaison arrived at Fasher by aeroplane from El Obeid.

With the difficulties of forcing our way across-country through the rain-scored sub-desert region still fresh in our minds, it was decided to regain the more comfortable true desert in the north by way of the Meidob Hills and the Crater of Malha, along the track, such as it was, which the motor machine-gun battery had already made on its journey from Fasher to Bir Natrun when it had attempted to intercept the Guraan after the raid in 1931.

For 150 miles we worked north with much difficulty; through thorn thickets, across dry gullies overgrown with bush, over hard cracked mud-pans and past little jagged hills, ploughing through interminable miles of heskanit.

This heskanit is a curse to most parts of northern Kordofan and Darfur provinces. It is a wild straw grass growing to a height of two feet. In the autumn it produces brown burr-like seeds which give it the appearance of a prosperous crop. When other supplies fail the people do actually sometimes use it for food. But from each seed a quiverful of tiny barbed darts project, by which the seed can adhere to the skin or fur of any passing animal and so be carried far and wide to propagate its kind. With the slightest pressure a dozen of these darts will stab painfully through one's skin. Instinctively one's fingers go to the spot to remove the burr, and are themselves pricked in many places. When it is pulled away the darts break off in one's skin, where they cause great irritation until extracted with tweezers.

One can ride through heskanit if mounted high up on a camel's back, or even motor through it with a car closed as if for driving in rain, but we had no mudguards, no windcreens—they had been shattered long ago—and no doors to the cars. The burrs drove in like snow, swirling round looking for a lee place to lie. They blew up our open shorts, surrounded our behinds, embedded themselves in our sleeves and shirts. At every movement, every jolt of the car, a dozen burrs would drive their needles into us. At the end of each half-hour or so things became so unbearable we had to stop to sweep out the cars, remove the darts with tweezers from the more delicate places and stamp about to relieve our pent-up irritation.

Life gradually thinned away. The general limit of villages and wells was left behind. The country became more and more brown and barren till presently on the second day only the heskanit remained. But in this region, well beyond the zone of habitation, the desert plain is broken by a

small group of volcanic hills whose peaks collect sufficient local rainfall to support a remote and isolated people—the Meidob. They are an aloof non-Arab tribe whose customs and organisation show traces of a great antiquity. They speak a language of their own, have no dealings with the nearer tribes, but make periodic trading journeys direct to Khartoum four hundred miles away with their sheep and cattle; returning with a far greater and more up-to-date knowledge of the outside world than their more parochial Arab neighbours.

The crater of Malha which lies on the outskirts of these Meidob Hills forms one of the principal watering-places of the tribe. Approached from the south its low lava rim is scarcely perceptible in the barren brown plain, whereon little sign of life has been seen for many miles. All is silence, till on clambering over the black lava blocks around the brink one becomes aware of a confused murmur of sound coming up from the ground.

Looking far down into the half-mile wide interior of the crater a surprising view appears. Surrounded by a steep wall of rock, down which tongues of treacly-looking lava hang freshly as if just coagulated, lies a circular sandy beach whence a ring of springs rise and drain away into a central lake.

The place when we saw it was teeming with life. Herds of camels, sheep, goats, cows and asses were being watered at the springs, tended by scores of busy Meidob families. Even as we looked, more flocks of white sheep appeared on the opposite skyline and poured down the lava cliffs like cascades of milk.

We too descended, being shown the way down by a venerable old man carrying a spear. Passing by, he had nodded to us casually, as if white men came to Malha every day, instead of perhaps once a year. It was the same down below: from politeness

they pretended not to notice us. As we wandered round the lake in the middle, samples of fresh and sweet milk were brought along, taken from every sort of animal present, while the benign old gentlemen smiled and urged us to drink more and more.

A very interesting account of the Meidob people and of Malha Crater has been written by Mr. Colchester in *Sudan Notes and Records*. It appears that although signs of volcanic activity seem so fresh, the last explosion must have taken place very long ago. The people have no legends of it. But there are tales that every few generations some subterranean activity still takes place, the lake level undergoing violent changes accompanied by rumblings. Once a lion came out of the lake and did great damage! The lake itself is composed of an oozy black liquid. The people wade into it up to their necks in order to scoop out from the bottom with their feet a black crystalline sludge which they sell as a certain cure for all cattle diseases.

For another day and a half progress was very slow and difficult while the awkward sub-desert country continued. It was a great relief when at last the open sand appeared once more, even though it was still covered with innumerable hummocks of dead heskanit over which it was necessary to drive very carefully in lowest gear.

It was in this hummocky country that the motor machine-gun cars had come badly to grief, breaking many chassis frames while twisting over the foot-high mounds. We fared better, probably because we were in less of a hurry and because, profiting by their experience, we had purposely omitted to strengthen our front springs with extra leaves, preferring to risk breaking springs rather than strain and break the main frames of our cars.

But finally even the grassy hummocks faded away,

till nothing remained but a thin crop of light dead grass varied here and there by wide patches of colocynth whose dead shells, the size of small melons, popped and crunched under the car wheels. We were back among the same undulating sand billows, with their undrinking population of ostrich and antelope, that we had traversed on the way south. Now, however, our course ran a hundred miles farther east, touching in places the exposed rocky surface of its eastern edge. Here, as on the outward journey when the western edge had likewise been seen, it was very noticeable that such thin herbage that still grew in places here and there was confined entirely to the loose mobile surface of the sand accumulation. On either side the desert itself was quite barren. Bearing in mind the great concentrations of mill-stones among the dunes S.W. of 'Uweinat, it seems likely that a very slight and rare rainfall can support herbage on a surface of blown sand when it is quite incapable of doing so on normal desert.

This opens up the possibility that although it is very unlikely that permanent wells can have been maintained from local rainfall in the Libyan Desert since palæolithic times, there may have been periods when a slightly more frequent rainfall produced enough grazing among the great dune-fields to support a nomad population for many months in the year. Even now, both in Arabia and on the Southern desert in Kordofan, the tribes are accustomed to live for long periods away from wells, supplied with liquid from the milk of their cattle, who in turn derive it from the green herbage on which they graze.

A desert, therefore, is not necessarily uninhabitable through lack of wells, but through lack of grazing, which in turn depends on the sterility of the ground as well as upon the rainfall.

In these latitudes a vague hollow called the Wadi Hawa, whose precise nature is not yet understood, emerging from the western border hills north of Kutum, runs north-east for 300 miles across the open desert till it is finally lost in the sands immediately south of Bir Natrun Oasis. Were it not for a broad belt of low trees which marks its bed (in which no water has ever been known to run), the wadi would be passed unnoticed, for as a valley it is so shallow as to be almost imperceptible.

Its existence had long been known, but its exact position on the map was uncertain. We had met it on the southward journey and had followed it south-west for fifty miles both to map its course and to search for the archæological remains with which, according to native information, its banks abounded. To see more of it, therefore, on this return journey we now made a detour to the north-west, instead of following the direct route to Bir Natrun as the motor machine-gun people had done.

Any unusual and solitary feature in the desert, whether it be mountain, tree or the skeleton of a man, crystallises about itself all the loneliness of the surrounding land. Seeing some object makes one realise the neighbouring emptiness in a way a complete blank desert surface never does. At 'Uweināt civilisation seemed infinitely farther away than it did in the open where nothing was visible. Here it was the same; a single feature appeared by itself, this time a belt of trees, unaccountable, out of place in its surroundings, meandering on and on across a featureless desert of sand, far from any other vegetation and from any well.

All along the banks, where the rolling sand dunes began on each side, the ground was strewn with stone implements—grinding stones and an occasional beautifully polished diorite axe, all of unknown date, together with bits of pottery which

may possibly be identified with that of the old Ethiopian kingdom of Meroe of 2000 years ago. Nothing remains alive now, however, but the trees; no undergrowth, no blade of grass covers the clean white sand underneath their branches, and no song bird breaks their perpetual silence. We camped among those old gnarled trees. In the light of the full moon which lit up the sand like hoar-frost, they cast clear-cut pools of shadow on the ground. The place was very beautiful, reminding one of an English park on a still winter's night.

Bir Natrun Oasis was reached on November 13th. It was deserted, and the choked water-holes suggested that no one had been there for many months. It was likely that since the caravan was attacked here the previous year no one cared to come to Bir Natrun to dig for salt any more. Like many of the other oases the floor of the depression contains salt pans and swamps of saturated brine; but, oddly enough, fresh drinking water can often be got by digging down a foot or two into the ground at the very edge of the salt.

The oasis lies in a typical Libyan Desert depression, with cliffs rising above it to the north-east and east. The prevailing wind which in this latitude blows from the north-east has worn the cliff away, stringing out the debris as a field of sand dunes along gently rising ground for sixty miles to leeward.

These dunes, however, in fact all the dunes in the south-eastern portion of the Libyan Desert, are of quite a different type from the long continuous ridges, or "swords" (Seif) as the Arabs call them, which cover such huge areas in the north and west. The shape of this second type of dune, the Barchan or Crescent Dune, is distinctive. It may be described as a circular dome of sand, from the leeward side of which a big bite has been taken, leaving a steep slope of loose flowing grains in

the form of a hollow semi-circle. The Barchan advances down-wind as a crescent with its two horns, each tapering to a point of sand on the ground, reaching out in front of it. The horns of a single Barchan may be as far apart as 400 yards, its maximum height may be 70 to 100 feet, and its weight something up to half a million tons.

Individual dunes of this type can exist by themselves many miles from their nearest neighbours and in country otherwise quite free from scattered sand grains; but it is usual for them to grow in colonies reaching down-wind in a broad belt, separated by shorter and shorter distances from one another as one goes towards the source of the sand, that is, towards the windward end of the colony. Here the individuals are packed so close together that they run one into another, but in all cases the characteristic crescent bite is preserved.

The Barchan consists of two simple surfaces, the dome and the concave surface of loose collapsing sand round the bite. The dune keeps its simple geometrical shape intact with extraordinary persistence even while it is on the move, and while it is passing over such large obstacles as rocks, small hillocks and villages.

Some innate tendency, some unknown effect of the interaction of wind and sand, keeps the ends of the two widely separated horns exactly level with each other. One can imagine some consciousness sitting on the domed top like a charioteer, checking each of them in turn in their blind advance, with a pair of invisible reins. Perhaps the fundamental difference between these Barchans and the longitudinal Seif dunes described previously in this book can be pictured by imagining the above checking tendency to be abolished, the reins broken, so that one of the two heads bolts ahead, leaving the other behind to shrink and disappear.

The inside face of the crescent, which has up to now been dragged forward evenly between the heads, is now left behind waving sinuously in the wind, forming the long single crest of a Seif dune.

That is only a simile; actually nothing whatever is known of the mechanism which forms and distinguishes these two types of great desert dune. No adequate explanation is as yet forthcoming of why sand grains collect into high dunes at all, instead of scattering haphazard over the lowest places—for the grains when they drive through the air are heavy and rarely rise more than six feet above the ground; or of why, once all the grains are collected from the surrounding country into neat chains of dunes, a sudden high wind does not blow them all about again.

I have heard it said that the dunes are just great over-grown sand-ripples, formed in the same way as sand-ripples are, by a process which is more or less understood. But in the first place the sand-ripple resembles neither of the two dune types in shape or permanence; and again, the true ripple is limited in size to a few inches from crest to crest, whereas I have never seen a dune smaller than thirty feet across. The two things are of a different order of size altogether, with no intermediate graduation.

These desert dunes must not be compared with the confused sand masses seen on the sea-coast, where salt, dust and vegetation contaminate the sand and prevent the free interplay of wind and sand grain. It is only in the depths of a rainless, dustless desert that the true dune forms appear.

The problems of the formation of the desert dunes are interesting, because the two types, Seif and Barchan, are not confined to the Libyan Desert. They occur elsewhere and seem to be the only two types existing. In some countries—Peru for

instance—the Barchan type is found, in others, such as Southern Australia, the sand runs to long Seif ranges. They never mix. In any one area only one of the two types is found, though no reasons have been found, geological or otherwise, why one type should grow in any place to the exclusion of the other.

I think the desert dunes, specially the Barchans, must be accounted definite organisms, existing by themselves and owing nothing to the surrounding land for their shape, which seems to be as inherent in them as is that of an organism of the life to which we are accustomed. After all, these desert dunes do live in a slow elementary kind of way. I do not mean “live” in the animistic sense in which I have spoken of them before, the sense in which a traveller or climber endows obstacles and mountains with hostility or friendliness, but in the much more real sense that these dunes appear to ape most of the attributes we think essential for a definition of life.

For as long as they are fed with a supply of grains, and as long as a motive power is available from the wind—just as the true life requires food and motive power from the sun’s rays to keep it alive—the dunes can move from place to place, can grow in size, can maintain their own particular shape and repair any damage done to them, and lastly, in the case of the Barchan dunes, there is some evidence that they are capable of a sort of reproduction whereby baby dunes are formed in the open a hundred yards or so down-wind of the horn of a fully grown parent.

From Bir Natrun an afternoon’s run brought us to within sight of Merga. We approached the nearest palm grove next morning with considerable caution, for here, if anywhere, the raiders should be living. Merga had long been known to be

an important raiders' camping-place, especially in the summer and early autumn when the heat and drought was too great for their animals elsewhere in the desert. Here they had unlimited water and some grazing, and could collect the autumn crop of dates of which the oasis yields a good supply. Merga alone of the northern Sudan oases might be able to support a small permanent population.

But Merga like Bir Natrun was empty. All we found was a group of well-built Guraan huts of grass and palm branch. Even the sacred tree to which they were supposed to sacrifice before their raids, and which Newbold and Shaw had found in 1927, had recently been burnt to the ground. After searching for further Guraan traces in all the other palm groves of this large straggling oasis we pushed on to the outlying depression of Wadi Hussein. Newbold and Shaw had been the first to visit this place and to add it to the map, during their journey in 1927. It is a wide sandy hollow sixteen miles long, full of half-dead grass hummocks with one group of four sickly date palms; a truly dismal spot. Here also there were Guraan huts, but more ruinous and sand-invaded. There were many signs of a hasty departure a good many months previously, perhaps after the Sudan Government's anti-Gongoi expedition in 1931, when Newbold in a reconnoitring aeroplane had flown northwards over Wadi Hussein, without, however, noticing anyone there.

Scattered in the sand we found such things as Italian cartridge clips and food tins, pieces of Shell petrol tins, pieces of a British R.A.F. aeroplane which crashed at Merga in 1930, child's dolls made of stuffed coloured rags on sticks, strips of cloth, date-cake, a drum, bits of harness, rope, camel bones and many very large heaps of ash indicating a prolonged period of occupation.

Of the final break-up of the raiding party little is known for certain, beyond that Gongoi himself was killed in a quarrel over some division of spoil, and that the rest of the Guraan have given themselves up to the French. Some of the unfortunate refugees from Kufra finally appeared in Kharga where Almasy in 1933 obtained from one an extraordinary tale of wanderings and privation. Where they were living when we were searching for them I am still unable to discover, though the story Almasy got seems to point to their being at some real though unknown water-hole somewhere to the north. There is evidence that some unidentified party were in Merga again a few months after we left, and then disappeared again.

Anyhow, the redoubtable raiding party is no more, and the exploits of Gongoi and his friends will pass into legend. It is a pity. Something has been removed from the romance of the desert; the ocean of prosaic law and order, ever creeping on a little farther, has now finally engulfed every corner of North-East Africa.

We had come 560 miles from El Fasher. The remaining distance to Wadi Halfa by a direct route through the Arba'in oases of Laqia and Selima was only another 420 miles, and about 200 miles of supplies was available on the cars over and above what was required to take us there, enough to make a big detour northwards in search of a further water-hole called Bir Bidi of which rumour spoke.

We could have had little enough to go on for its location—a story told by one old guide who had himself been a raider in his youth—had not Newbold on his flight north of Merga the previous year seen something from the air. The day was hazy and the pilot in a hurry, but there appeared to him to be a small hollow containing a green bush or bushes with a little runnel leading into it. There were

a number of tundub bushes in the neighbourhood.

From Merga, therefore, we steered a north-westerly course, watching the aneroid carefully for any indication that the land might be descending towards the water level of the oases, at which level only would it be at all likely that a water-hole existed. But the ground rose steadily: nowhere was there any sign of Bir Bidi or of any hollow deep enough to penetrate to water level. Finally, we turned east towards Laqia and struggled in bottom gear over a most trying plateau of hard boulders.

There appeared to be nothing north of Merga, except a single half-dead tundub tree which Ball had passed with Kemel el Din seven years before, and noted down on an otherwise blank map. Craig with amazing accuracy steered us to it after a tortuous dead-reckoning course of more than fifty miles. The tree was about five feet high with two thin branches still alive. On one of them a little bird was perched. Not far beyond this some patches of grass had grown up among the rocks after a shower a year or so before, but were now quite dead. It is possible, but not likely, that Newbold may have mistaken one of these patches when they were green for something more substantial. The difficulty was that we had no definite place in which to look.

One often hears it said that the aeroplane is obviously the best means by which to explore new country, rendering the car and camel quite out of date. This is by no means true, though as an auxiliary for short scouting flights it may certainly be useful. In the first place, for topographical information to be of use it must be accurate. But the observer up aloft, though seeing the country spread out for many miles around, is in no position

to be accurate about anything he sees. No survey officer would dream of adding details to a map when their location had been determined only by a dead-reckoning course in the air.

On the ground one can expect a dead-reckoning motor run of a hundred miles to be accurate to within a single mile; at sea, owing to slow currents, the accuracy is less; in the air, where vaguely guessed air currents may be anything up to a quarter or more of the speed of flight, estimated positions may be hopelessly in error.

With no fixed landmarks on which to take cross-bearings, the airman must come down to earth and take star observations to get his position, and once down, in what way is he better able to locate features around than a man who has just alighted from a car? It is a tantalising situation; from the air the observer sees so much of interest, yet if you say "show me on the map where all these things are," he cannot tell you truthfully except to answer, "somewhere within ten miles of here." It is impossible to put information of this kind on any map or to record it in any useful way.

Again, there is the difficulty of interpreting what is seen from the air. It is terribly hard when flying over the desert to distinguish anything in the glare and haze. Time and again vegetation and oases have been reported by aircraft. On this journey of ours no less than three areas were visited in which things had been reported to exist; a crater north of Meidob said to contain a lake, a valley lined with trees west of Bir Natrun, and here a hollow with vegetation. The crater was a cup-shaped sandstone hill where green grass grew, the valley was a short chain of small isolated hollows with a few scattered bushes in them. The hollow could not be found, so that in the last case one cannot compare appearance with reality.

Some difficulty was found in reaching the twin oases of Laqia. It is awkward, as I mentioned somewhere before, when the course, as plotted in pencil on the map from compass and speedometer readings, arrives, as intended, at a large marked feature which should be plainly seen, to find nothing on the ground to correspond. One's first instinct is to doubt the navigator. As a matter of fact Craig's course was exactly right, and we had the satisfaction of moving the two Laqias bodily from one map sheet to another.

After an exciting bit of mountaineering with the cars to get them up the cliffs of the imposing gorge-like depression of Laqia Arba'in through which the old slave road used to run, the now familiar trail of bones, camel tracks and cairns led on towards Selina from one old camping-place to the next. At each halting place the old caravanners used to gather flat stones to make into little platforms on which to place their water skins for the night; and their camp fires made little heaps of ash. One can see them still, just as they were left; both are ageless, like most other desert remains. Found in any other place than on a known caravan road, one might dig into them expecting to unearth relics of Stone Age man. It is this agelessness which makes desert archæology so difficult.

At Wadi Halfa, which was reached on November 19th, the expedition proper was at an end, but Cairo was still nearly a thousand miles away and the cars with their load of kit and instruments had to be got back somehow. We might have returned along the Nile, but it would have been a slow and tedious business, with neither the freedom of the open desert nor the convenience of real roads. Or we might as in 1930 have followed the Arba'in track through Kharga and Asyut. But

having made new tracks across-country for so far, we all felt more inclined to keep to new country until the very end by steering a direct course from Halfa to Dakhla Oasis and thence due north to Baharia, whence 200 miles of established road led to Cairo.

At the time it seemed a reasonable route to take, not much longer than either of the alternatives, and the cars were still going as well as ever. All the same, a year or so before we should have regarded that last thousand miles as an expedition in itself and made great preparations for it.

Somehow it seems that if cars are treated decently they will never let one down in an awkward place. If they have to break they will rather choose the most convenient spot to do it—a town, an oasis or a water-hole—like camels that die near a well more often than elsewhere. In all our journeyings only three unrepairable breakdowns had happened. The first was on Prendergast's first trip with us, to Siwa. His Ford, which had a specially geared back axle, had sheared all its differential bolts. The thing might have happened out in the blue among the petrified forests 200 miles from anywhere, but the car waited till it was within a mile of Matruh on the coast; the only place on a trip of 1000 miles where spare parts and a workshop were available.

In 1929 our lorry broke its gear-box within a few miles of Dalla Well at the end of Prince Omar Toussoon's ready-made tracks leading direct to Cairo, though a breakdown would have been far more likely in the depths of the Sand Sea. And in 1930 also, when one car had to be left behind, the fault occurred at 'Uweinat, the only place on a journey of 3000 miles to which another party using the same make of car and carrying the necessary

spare parts might possibly be going in the near future.

Now, after nearly 6000 miles, the main chassis frames of two cars cracked in halves at the back. The first broke actually at Baharia within 200 miles of home, and the other shortly afterwards. It was not a serious matter; for we carried spare frame members with us, but it was the first real breakdown we had had on the journey. Harding-Newman and I were able at Baharia to replace one member in four hours, working at the rivets by night with chisels and heavy hammers. The other car ran as it was into Cairo, emptied of its load and its back supported with lumps cut from an old tyre cover.

One little thing after another came adrift in that last couple of hundred miles. The cars which had held together valiantly for so long and had struggled over such incredibly bad country seemed at last to be breaking up. In reality though they were sound enough inside, and after Harding-Newman had given them a thorough overhaul they were still good for a lot more work. I believe they are running still. The late Lady Clayton used one of them on her expedition with P. A. Clayton to the Sand Sea and it gave no more trouble than it had given us. Another is now owned by the Sultan of Geneina.

Like the cars our party too was breaking up, though, alas, much more permanently. The members of the old desert-walloping combination which used to trek about Sinai and appear with beards and in scruffy clothes to shock adventurous tourists at the little inns of Transjordan were now dispersing farther than ever before. Craig and I were off to China, and Prendergast had already left us at Halfa complete with a newly-bought private

aeroplane, to join the Western Arab Corps at far-away Fasher.

Ever since I had left for India five years before, Prendergast had stayed on in Cairo, where his rooms and garage had been the depository of all our gear from one expedition to another; the cooking pots, the spare parts and tools, the rope ladders I had laboriously knotted up in India with alpine rope and bamboo rungs, the same old steel channels Bader had picked up in 1927, the sun-compasses, the tubes and fittings of our water economisers.

They were ours, together with the host of other tricks we had learnt; they had been the means of setting a new standard of what cars could do across-country. Not only had they served our own party well, but they had been borrowed on more than one occasion by the army for experimental expeditions, including the big convoy to the Sudan in 1932 in which Prendergast had taken part. On each return Prendergast had carefully collected them and stored them up ready for next time.

Now there would be no more next times. We felt a little like children saying good-bye to their toys. They were good toys, that had been the means of giving pleasure, interest and excitement to more than a score of people for six years. Each one of these people had contributed something to them and to the technique that was gradually evolved, so that any credit which attaches to our later expeditions is due to the combined efforts of everyone who took part, both in these and in those earlier jaunts in which we gained the knowledge and ideas that made them possible.

There are few truer sayings than that old one about the Nile water. Some of us are sure to drift back to the Libyan Desert again, with the excuse,

no doubt, of following up one or other of the many scientific problems it still presents.

Meanwhile those of us who are in England collect once a year at the annual dinner of the Zerzura Club, together with others of our own and of the older generation who have become infected with the charm of the Libyan Desert.

CHAPTER XI

ZERZURA, THE WISH-OASIS

It is generally agreed that the word is most probably derived from "Zarzar," the Arabic name for a starling or sparrow; so that Zerzura means "the place of the little birds."

MANY references have been made in the daily press within recent years to the last remaining "lost oasis" in the Libyan Desert; the reality of its existence has been argued in the pages of the *Geographical Journal*; expeditions have searched for it, some indeed with that primary object avowed; others, like our own, with many aims, but still with Zerzura borne in mind—in case, just by the merest chance . . .! The possibility that there may be still in the world an undiscovered place makes an interestingly wide appeal to the civilised imagination; and when, in the pursuit of its whereabouts, one is led, owing to the blankness of modern knowledge about the country in which it is supposed to lie, to search back and back, from native statements to native tradition, thence to old Arabic writings, perhaps even to the Greek classics, the thing becomes as intriguing as a detective story.

Till quite recently many real places were for Europeans, as we have seen, merely unlocated names, and there was little reason to suppose that Zerzura would not in time be found, just as 'Uweinat and Merga had been found. But there had always hung about the legends of Zerzura a certain elusiveness from which the other names

were free. No sooner is a hopefully reliable piece of evidence found which would appear to tie it down to some definite spot than another account transforms it into an obvious fairy story, or snatches it away, to dangle it, an enticing carrot, a long way farther off.

The earliest mention of the name Zerzura that has yet been found occurs in a manuscript written about A.D. 1246 by one Osman el Nabulsi, a Syrian emir who was administrator of the Faiyum province on the edge of the Nile. He states that it was one of a number of abandoned villages immediately south-west of the Faiyum. As the names of two of the other villages correspond with present place-names near by, the account seems credible enough, though lacking in romance.

But then, on the other hand, we come to the *Book of Hidden Pearls*, a magical work by an unknown Arabic author in the fifteenth century, containing stories of hidden treasure at about four hundred different sites in Egypt, and of how to find it by means of incantations and fumigations. In this book the name Zerzura occurs again:—

“In the city of Wardabaha, situated behind the citadel of el Suri, you will see palms, vines and springs. Penetrate into the wadi and pursue your way up it; you will find another wadi running westwards between two mountains. From this last wadi starts a road which will lead you to the city of Zerzura, of which you will find the door closed; this city is white like a pigeon, and on the door of it is carved a bird. Take with your hand the key in the beak of the bird, then open the door of the city. Enter, and there you will find great riches, also the king and queen sleeping in their castle. Do not approach them, but take the treasure.”

The first European reference to the name is in a

book by Sir Gardiner Wilkinson published in 1835. He says:—

“About five days west of the road from el Hez to Farafra is another Oasis called Wadee Zerzoora, about the size of the Oasis Parva, abounding in palms, with springs, and some ruins of uncertain date. It was discovered nine years ago (*i.e.*, about 1826) by an Arab in search of a stray camel, and from the footsteps of men and sheep he there met with, they consider it uninhabited. Gerbabo, another Wah, lies six days beyond this to the west, and twelve days from Aujela; and Taiserbo, which is still farther to the west, forms part of the same Oasis; and they suppose that Wadee Zerzoora also communicates with it. The inhabitants are blacks, and many of them have been carried off at different times by the Moghrebins for slaves; through the ‘Valleys of the Blacks’ a series of similar Oases lies still farther to the west.”

In a footnote he adds:

“It is supposed that the blacks who invaded Farafra some years ago, and kidnapped a great number of the inhabitants, were from this Oasis.

“By another account, Zerzoora is only two or three days due west from Dakhleh, beyond which is another wadee; then a second abounding in cattle; then Gebabo and Tazerbo; and beyond these is Wadee Rebeeana; . . .”

As Dr. Ball, from whom I have quoted both the above extracts, points out, particular interest attaches to Wilkinson’s account of the tradition, not only because of its being the earliest, and therefore less likely to be coloured by imagination than later versions, but also because of the remarkable fact that although some of the other places named

in the extract were unknown to European geographers at the time, they have all since been discovered; "Gebabo" and "Tazerbo" by Rohlf's, and "Rebeeana" by Mrs. Forbes and Hassanein Bey. Gebabo is the name given to the principal group of springs which constitutes Kufra, while Tazerbo and Rebeeana are outlying groups to the north and west.

This account would place Zerzura somewhere in the Sand Sea, so that its non-discovery would not have been difficult to explain; but here again the truthful ring of the story is spoilt by the introduction of a second alternative position sixty miles or so from the first.

In 1874 Rohlf's at Dakhla heard about Zerzura from the inhabitants, but no one could tell him where it was.

The problem of Zerzura seems to have exercised people's minds appreciably in the nineteenth century, for in Murray's *Guide to Egypt*, published in 1896, no less than four different positions of it are given, all obtained from Arab statements; two of these positions would again lie in the Sand Sea, and two others somewhere south of Dakhla.

In the twentieth century Mr. Harding King during his travels beyond Dakhla in 1909 and 1911 heard of Zerzura both from the people of the oasis and from two independent bedouin sources. The Dakhla people put the place somewhere to the south-west of their oasis, and associated it with black men who had come in mysteriously from that direction in the past; while the two bedouin whom he met on separate occasions both spoke of having actually seen a large oasis with olive trees, palms and ruins south of Dakhla and north of Merga.

Apart from one memory of an "Um Zarzar" somewhere north of Laqia by a very old man at Dongola in 1916, the stories of the lost oasis under

the actual name of Zerzura seem to have ceased for the last twenty years; but as a result of researches by Newbold,¹ Harding King,² de Lancey-Forth³ and Dr. Ball,⁴ a formidable array of descriptions of unnamed oases have been collected.

The whole collection, including the above legends of Zerzura itself, can be divided into three groups according to the areas to which they refer and to the explorers by whom they were especially championed. In the north, the Sand Sea west of Dakhla and Farafra; in the south, the vast area between Dakhla, Selima and Merga; and in the centre the country south-west of Dakhla extending towards 'Uweinat. Unfortunately even then, by making the widest possible allowances for errors in reckoning distances in camel days and for the well-known vagueness of the bedouin in describing bearings, the various positions in each area cannot by any stretch of the imagination be made to coincide to within 150 miles or more.

The northern, Sand Sea, area was keenly supported by Col. de Lancey-Forth. He was the strongest and most enthusiastic upholder of the real existence of Zerzura. I believe that throughout his long years of illness the one thought that buoyed him up was that one day he might be well enough to go out again and put his theories to the test. During the short recovery before his death he actually returned to Egypt to set about preparation for another journey into the desert. Being the only living man prior to our journey of 1930 who had penetrated into the Sand Sea, his opinion carried

¹ "Sudan Notes and Records," Vol. XI, 1928. *Geographical Journal*, Vol. LXXII, Dec. 1928.

² "Mysteries of the Libyan Desert" (1925). *Geographical Journal*, Vol. LXXII, Sept. 1928, and Vol. LXXV, Jan. 1930.

³ *Geographical Journal*, Vol. LXXV, Jan. 1930.

⁴ *Geographical Journal*, Vol. LXX, July-Sept. 1927; Vol. LXXII, Sept. 1928.

great weight. Whenever I saw him, both in hospital and afterwards, I came away convinced by his enthusiasm that there was indeed something to be found far away among the dunes.

In favour of the existence of an oasis in this area we have tales as old as that of the astrologer Musa Ibn Nasr in A.D. 700, who, as is recounted in the anonymous History of Siwa, went a seven-days camel journey south of Siwa and came to a town with iron gates! More solidly we have Wilkinson's account already mentioned, of an oasis with palms, springs and ruins seen by an Arab looking for a stray camel. In addition there are some half-dozen stories collected by Harding King, and de Lancey-Forth from Arabs, of an oasis found among the dunes, each time in a different place. Several of these stories also mention palms and ruins, varied by a lake with little birds about it. Always, if the finder tried to return thither with others, he was unable to retrace his steps. Always, too, the finder was at the time of the discovery either himself lost or was wandering in search of a lost camel.

The camel is indeed responsible for much of the Arab's knowledge of the North African deserts; not, as the reader might assume, owing to its uncomplaining and tireless service in carrying the explorer over trackless wastes under the burning rays of the sun, but merely by getting itself lost. How many of the far-off oases have been discovered in years gone by because an Arab has had to go out into the unknown searching for his lost camel.

Prior to 1930 there might have been anything in that wilderness hidden by 300-foot dunes over whose crests it is impossible to see except by climbing to the top. Crossing so many of them at right angles though, we saw far more country than either Rohlf's or de Lancey-Forth could have done; and since our journey Lady Clayton East Clayton and

P. A. Clayton have seen even more. But on neither occasion was any indication of an oasis found. Still, it is impossible on the ground to see into more than two dune valleys at a time, and it will be many years before the Sand Sea is thoroughly explored. Up to the present no one has dared to fly over the Sand Sea owing to the risk of a forced landing on soft sand among the dunes and the disaster which would probably result.

In the southern area, roughly 400 miles away, which Dr. Ball and Newbold prefer, though both of them are now somewhat sceptical about it, we are on firmer ground both literally and in the quality of the evidence. There are no bewildering dunes here to hallucinate the mind of a man who has lost himself, and there are no ancient records amongst the evidence to distract one's judgment.

In the first place there are Harding King's informants; one, an Arab who saw eight days (*i.e.*, about 240 miles) south of Dakhla a large oasis with olive trees, palms and wells, one big ruined town and several hamlets with a few people. He said he was afraid to approach it. Harding King did not think this man was too reliable. The other, a Bedai (*i.e.* partly Tebu) tribesman whom he thought a particularly sound man, also saw a large oasis with olive trees and tamarisks five days, about 150 miles, north of Merga.

Next comes the report of a party of Arab tribesmen sent out by the Sudan Government in 1916 from Bir Natrun, to the effect that one and a half to two days north-west of Merga they had found a well, with a track leading farther on in the same direction, which they followed till a large hill was seen in the distance. The direction pointed towards 'Uweināt, and the hill may possibly have been 'Uweināt or Kissu.

Another and still more reliable report is by the

well-known Bedai guide Bidi Audi, now an old man. He stated that in 1904, while on a raid from Merga to 'Uweinat to steal camels, he found 30 to 40 miles north of Merga, a crater-like depression in the sand, half a mile wide and 100 feet deep, containing trees and grass. Water was plentiful two feet below the surface at the bottom, so much so that his caravan on a second visit in 1915 watered 168 camels there and filled 100 water skins.

Lastly, Newbold himself, as I have already mentioned, saw from the air in just this area what looked (though the light was very bad) like a hollow with vegetation in it.

The third area, south-west of Dakhla, was championed by Harding King. The evidence upon which rests the site of an oasis in this area is of quite a different kind from that supporting the existence of one in either of the two other. It rests entirely on tales told by the Dakhla natives of incursions of black people from the south-west. There is no description of the place itself and no mention of anyone having seen it.

One of the Rohlfs expedition of 1874 was told on good authority that "about 1770 there had been frequent raids on Dakhla by Arabs from the south-west, and that in order to stop these raids the Mameluke Government of the time installed a military colony . . . who went out and destroyed all the wells for seven or eight days' distance along the road by which the raiders had come. This road, which up to that time had served as a trade route from Darfur before the road through Kharga was opened up, was in consequence forsaken."

Another traveller was told by the Dakhla people that in 1840 a man and a woman driving a cow came in to the oasis from Zerzura. Harding King heard the same tale in different forms—that as late as 1895 strange cows had come; that a woman

and a boy had come in from the south; and that years ago some very tall black men with long hair and nails came out of the south-western desert and stole bread from the people. They were pursued, and their tracks followed to a well which the pursuers salted to prevent its further use.

We can corroborate this last tale as real evidence, or else demolish it, according to our individual temperaments, by an extract Newbold has made from the writings of El Bekri about the year 1068 A.D. of a black giantess who apparently came from a lost oasis called Sobrou south-west of Dakhla, and was captured stealing dates. She spoke no known language and was released so that her captors could track her to her home, but she outran them and they failed. El Bekri's mention of Sobrou is typical of most of the Zerzura stories. It was a lost oasis. No one had been able to penetrate to it except travellers lost in the desert. An Arab called Regma ibn Kaid . . . chanced upon it but could not later return to it. About A.D. 1029 the Emir of the Beni Corra . . . tried to reach it with an expedition but his provisions ran out.

Harding King also heard about 'Uweinat, which was said to lie in the same direction, and so convinced was he that something did exist away out in the desert that in 1911 he trekked out for 200 miles to try and find it. He found nothing though, except uncertain signs of an old camel road running towards 'Uweinat.

When in 1917 Ball discovered out there a large collection of old broken pottery jars marked with the tribal signs of the dark-skinned Tebu, and evidently meant for storing water, all by themselves at the foot of a hill 120 miles south-west of Dakhla, not only did the existence of an old traffic across the desert south-west of Dakhla

become more likely, but the ability of human beings, Tebu or Arab, to reach Dakhla from the south-west was explained. At the same time, on the other hand, the depot of pottery almost ruled out the existence of any intermediate oasis on the route to 'Uweinat, because if one had been there the expensive maintenance of a water depot more than a hundred miles from anywhere would have been pointless.

Harding King, however, still stuck to his idea, and in the end he was found to be right after all. Something was found south-west of Dakhla. It was the valley containing some trees which, as already mentioned, the Almasy-Clayton party saw from the air upon the Gilf Kebir plateau. P. A. Clayton, Almasy and others have been there recently by car and found in addition two other similar valleys in the Gilf. It appears now that the Gilf Kebir Plateau, previously thought to be as rainless as the rest of the desert, is just high enough to precipitate a sufficient rainfall, like 'Uweinat, to maintain permanent vegetation in certain favoured places, and that the existence of these valleys has long been known to the old Tebu inhabitants of Kufra, even if unknown to the Arabs. It is said to rain there once every eight years or so, and after these rare occasions the blacks are still in the habit of driving their cattle there to graze.

The find in the Gilf Kebir was therefore by no means an oasis. Except for El Bekri's Sobrou, the stories relating to this area never specified an oasis nor even a permanent water-source. There are indeed very strong reasons now for believing that no true oasis with unfailing water from the general artesian supply down below could possibly be found in this area.

These reasons arise from a wonderfully simple theory due to Dr. Ball whereby the approximate

height of the artesian water level above the sea can be calculated at any given place in the whole Libyan Desert. The theory is based on the fact that wherever the underground water appears at the surface, in oasis lakes and in wells that have been sunk, the heights to which the water rises under its own static pressure are not haphazard as might be expected, but are related to one another in such a way that the exposed water surfaces scattered over the desert all lie on a single imaginary surface which is almost flat, though slightly tilted down towards the north-east.

As the success of a theory depends largely upon whether it can be used to foretell things which are not known at the time, Ball in order to test his theory, predicted the height above the sea of the artesian water level where it rose to the surface in the two oases of Selima and Laqia, neither of whose altitudes had yet been measured. As both of these oases were more than 150 miles from the nearest datum points used in the formulation of the theory, the test was a severe one. Shortly afterwards the altitude of Selima was measured by Newbold and Shaw in 1927, and the result was checked again by us in 1930 and 1932. Similarly, the altitude of Laqia was measured by us in 1932. In each case the actual height found agreed remarkably well with Ball's prediction.

Knowing by this theory at what height above sea-level the water stands underground at any place, it is necessary only to measure the height of the land surface itself to tell at what depth water will be found by digging. The general lie of the desert and the altitudes of the land surface above the sea are now known with some accuracy, so Ball was able to produce a map in which the depth of the water below ground is shown by contours. From this map one can tell at a glance

what portions of the country lie high above the water, and what portions are near down to it.

Now, for an oasis to exist at any point in the desert, water must be available there at or within a few feet of ground level. If from Ball's map we see that the general level of any area of country is near to that of the water underneath, then there is an obvious possibility that at the bottom of some unknown hollow in the surface a water-hole may actually exist. In other parts where the general land level is high above the water, the unknown oasis hollow would have to be very deep for this to happen.

As the only agency by which such a hollow could be formed is the erosion caused by the wind, a deep hollow could hardly be made without widespread indications of its presence being visible around it, in the shape of cliffs, broken ground and a general downward slope of the surface. The fact that no such signs have been seen by travellers make it almost impossible that an undiscovered oasis exists anywhere in those areas where the general level of the ground is high—several hundred feet—above the water. The whole country between Dakhla and 'Uweinat, as well as much of both the northern and the southern area about which traditions of an oasis exist, can therefore, as a result of Ball's theory, practically be ruled out.

In the remaining parts of the traditional areas, the chance of there being some small hollow which might penetrate to water level depends upon the irregularities and uncertainties of the ground heights. Up to now, as the heights of more and more points on the ground are becoming known by aneroid measurements along traveller's routes, the number of possible bits of desert in which a natural wind-excavated hollow deep enough to reach water level might lie is rapidly shrinking.

In short, it is now very unlikely that a new, previously unknown, oasis of the true artesian type, with a permanent water supply and corresponding in character to the bedouin traditions, will ever be found anywhere in the Libyan Desert. Even if in future something more does indeed emerge into the realm of fact, how are we to identify it as Zerzura in preference to some other unnamed place? Must Zerzura necessarily be a white-walled city with a locked gate, in an oasis with trees and palms? Must it be inhabited by blacks and must there be a lake with little birds?

But, it will be argued, the matter should not be left like this. Granted that the Dakhla stories may be satisfactorily explained by the occasional occupation of the Gifl valleys, after it has rained there, by the black Tebu who could thence reach Dakhla either direct or by means of their water depots in the desert, there must surely be something real behind the other stories which actually describe details of an oasis. There must be some reason for the persistence of the name Zerzura, and for the trees and ruins.

The problem is very difficult. The reader must agree that the evidence I have given is rather hopeless. But it is all we have to go on. We know so little of the past whence the legends come. Several attempts have been made to explain these legends away, but they are all unconvincing. There are so many possibilities. Assuming that Zerzura does not now exist, it may have done so once, in some hollow fed by local rain, at a time when rain fell more frequently than it does to-day; or it may even now have a foundation of reality, being an exaggeration of some small inconspicuous water-hole, difficult to find and

soon lost again, but still existing, perhaps somewhere north of Merga; or again it may exist entirely in the bedouin mind.

In favour of the local rainfall idea it should be mentioned that in 1932 we found two separate places where heavy storms some time in our generation had flooded the country for many acres, so that small trees still grow there. At one of these places a large lake must have persisted for several years, for the ground was covered with millions of fresh-water shells. Around such a lake grass would grow, and possibly Tebu might have come to graze their cattle, building their square grass huts. Perhaps the ubiquitous little migrant birds would collect there. Then the lake would dry up, the huts fall into ruins, and the whole site would disappear. If this were Zerzura, it would wander from place to place through the centuries, appearing here or there according to the whim of some rare storm.

For the second hypothesis, that of the real existence of a small water-hole the tale of whose finding has been embroidered upon by the finder, there is also a little fresh evidence. In the last two years several old explosion-craters similar to the one at Malha have been found by Clayton and by Sandford in the neighbourhood of 'Uweinat. It may be that another exists in the sandstone country north of Merga, and that the bottom of it, like that of Malha, reaches to the water level. Like Malha, too, its rim might be low and almost invisible from the outside. The guide Bidi's description certainly fits such a crater.

But I prefer to think of Zerzura as something that has never yet been seen with human eyes, but only as an image conjured up in the Arab mind of something he would like personally to discover; appearing to the townsmen, for whom

the Book of Hidden Pearls was no doubt written, as a treasure city he could loot; to the thirsty bedouin wandering in the sands, as a shady oasis similar to those he knew. We know so little of the reactions of the fatalistic bedouin mind either to the unknown or to the prospect of a death by thirst. It is possible that under the mental stress of solitude and fear his wish-oasis might become a memory of imagined reality which he would afterwards describe to others; and as the distant prospects of all oases are very similar to one another, so the descriptions would agree in all their essential details except that of geographical whereabouts. But the bedouin is not given to self-analysis or to disentangling facts from fancy, so we shall never know the truth.

Another aspect which should perhaps be borne in mind arises out of the peculiar history of the Arab race. Not so very long ago they conquered and overran half the world. Multitudes of simple bedouin, pouring out of the sandy heart of Arabia, knowing nothing of property or of civilisation, saw for the first time the wonders of the world. Wherever they went, to east or west, glittering unimagined cities appeared, containing fabulous riches. For years they went on conquering. Country after country fell and was plundered—Syria, the great Persian Empire, Egypt, North Africa, Spain. But always there were stories of more wonderful things beyond. In Egypt especially, with its countless tombs and buried things, the idea of hidden treasure became an obsession with them. Is it not likely that a permanent trait arose, a proneness to believe that there was something more to be found just a little farther on?

I like to think of Zerzura in that light, as an idea for which we have no apt word in English,

meaning something waiting to be discovered in some out-of-the-way place, difficult of access, if one is enterprising enough to go out and look; an indefinite thing, taking different shapes in the minds of different individuals according to their interests and wishes. For the Arab it may be an oasis or hidden treasure; for Europeans it may be a new archæological site, some find of scientific importance, a new plant or mineral; or just an expectancy of finding anything that is not yet known.

Or for the less scientifically minded it may be still more vague; an excuse for the childish craving so many grown-ups harbour secretly to break away from civilisation, to face the elements at close quarters as did our savage ancestors, returning temporarily to their life of primitive simplicity and physical vigour; being short of water, to be obliged to go unwashed; having no kit, to live in rags, and sleep in the open without a bed.

Zerzura is sought in many places, in the desert, at the Poles, in the still unsurveyed mountain regions of Asia. There is no fear that the quest will end, even though the blank spaces on the map get smaller and smaller. For Zerzura can never be identified. Many discoveries will be made in the course of the search, discoveries which will make the seekers very happy, but none will surely be Zerzura. A new water-hole may still be found, a Stone Age burial-ground or a reef of gold, but it will not be Zerzura. The answer to the riddle of the dunes may be discovered, but it will not tell us where Zerzura lies.

As long as any part of the world remains uninhabited, Zerzura will be there, still to be discovered. As time goes on it will become smaller, more delicate and specialised, but it will be there. Only

when all difficulties of travel have been surmounted, when men can wander at will for indefinite periods over tracts of land on which life cannot normally exist, will Zerzura begin to decay.

Perhaps a long time hence, when all the earth's surface has been seen and surveyed, there may be nothing left to find. Fancifully we can picture the excavator rummaging about with his pick in the last yard of unexamined soil. Behind him we catch a glimpse of experts, microscopes and notebooks, while in front, very near now, stand the locked gates in the city's misty walls.

The pick is withdrawn. The time has come at last when the experts can close their notebooks, for there is nothing else unfound. We see Zerzura crumbling rapidly into dust. Little birds rise from within and fly away. A cloud moving across the sun makes the world a dull and colourless place.

EPILOGUE 1987

I had no idea at the time that our travels could have any serious scientific outcome. It was only later that it dawned on me that the natural mechanism we had become so familiar with whereby the wind blowing on loose dry sand grains creates and activates the huge dune forms was as yet entirely unknown. I became so interested that on my retirement from the army in 1935 I built at home a suitable wind-tunnel of plywood and glass panes and equipped with simple wind-measuring instruments. With this, some sieves and a supply of builder's sand, I embarked on the first scientific study of the mechanism. I felt it was really just exploring in another form. *The Physics of Blown Sand and Desert Dunes* was finished in 1939 and published shortly afterwards. To my astonishment it soon became the standard textbook on the subject, and still remains so. Indeed, when NASA's spacecraft were able to examine the Martian landscape at close range, the book was found to allow the sand-driving mechanism to be adapted to the very different and far more tenuous atmosphere of Mars.

Although most of us were young army officers, not one of us in the 1920s dreamed for a moment that war could ever come to the vast waterless and lifeless Libyan Desert. We simply enjoyed the excitement of pioneering into the unknown. But the Second War was declared almost as soon as the Physics book was finished. (I had served in the First War in the trenches in France as an engineer officer and, as a recompense, spent two happy years at Cambridge.) Now, as a reservist, I was recalled to the army in the autumn of 1939 and posted to East Africa. It was by the pure accident of a convoy collision in the Mediterranean that I was landed at Port Said to await another troopship. Seizing the opportunity I took a train to Cairo to look up old friends. That visit, again accidentally, resulted in my posting being changed to Egypt, a country I was at home in.

HQ British Troops in Egypt was just the same as I had known it. Its role having long been confined to internal security it seemed as yet to have given no thought to the defence of the country against attack from outside. Training had always been for a war in some temperate climate rather than in the desert on its doorstep. The staff seemed to be obsessed with the danger of any soldier getting lost, to the frustration of the more enterprising troops under it. The 700-mile western frontier with Libya, running south nominally along longitude 25°E , was unguarded and unpatrolled, the Light Car Patrols of 1916 having been disbanded long before, and most types of army vehicle were unsuitable for desert going. I wrote a three-page memo on what my experience suggested should be done in a small way, such as re-forming an up-to-date version of the Light Car Patrol. My general thoroughly agreed and sent the memo to HQ.BTE. The idea was turned down angrily as though it was impertinent. Even the idea

of driving out into the desert seemed to appal them as impossible, insane or at least reckless.

In the spring of 1940 things began to change. General Sir Archibald Wavell became an overlord, as C-in-C Middle East Land Forces with responsibilities from India to West Africa. A fresh staff was arriving from England to form his new GHQ. So HQ.BTE sank to a subordinate position. All this time we knew that a great Italian army was massing on the Libyan coast ready to invade Egypt, and another equally large army lay in Ethiopia ready to invade the Sudan. But on our side no overt defence preparations were allowed, in the vain hope that Mussolini would remain neutral.

Then came June 1940. France collapsed. Italy declared war on us. The Mediterranean was closed so we were cut off from England except by the long slow shipping route round the Cape. I felt impelled to do my bit. Pulling out the last copy of my former memo I added a few paragraphs and persuaded a friend in Operations to lay it on the C-in-C's own desk. I was sent for within an hour. Wavell was alone. He put me at ease in an armchair and invited me to talk. Here, I felt almost at once, I had found at last a man of vision and vast knowledge who understood. I told him of the possibility of an enemy raid on Aswan from their southernmost outpost of 'Uweinat only 500 miles away across ideal desert going. I had myself done the journey in a day and a half. Such a raid would cut our vital link with the Sudan. If attacked, the raiders would simply threaten to open all the sluices of the Aswan Dam and cause a disastrous flood in Egypt. Moreover, if Lorenzini was still in Libya he would be just the man to do it. He and I had discussed that very thing during our strange desert meeting years ago. We had now no means of knowing what the Italians might be preparing away in the far south.

I proposed that a small group of modernised Light Patrols should be created, specially equipped, manned by specially trained volunteers in really desert-worthy vehicles. By applying all the techniques our former little private parties had learned, we would have the extreme mobility of 1500 miles of travel entirely self-contained, with water and food for several weeks. We could get into the emptiness of inner Libya by a backdoor I alone knew of, through the heart of the sand barrier. We would then track-read both the routes leading south. 'What', asked Wavell, 'would you do if you were to find no signs of unusual activity?' Without thought I said, 'How about some piracy on the high desert?'

At the word piracy the rugged face that had seemed a bit stern suddenly broke into a broad grin. 'Can you be ready in six weeks?' I said, 'Yes, provided ...' 'Of course', he said, 'there'll be opposition and delay.' He pressed a bell. His chief of staff, General Sir Arthur Smith, came in. 'Arthur', said Wavell, 'Bag-nold seeks a talisman. Get this typed for my signature right away.'

"To all heads of departments and branches. I wish any request made by Major Bagnold in person to be met at once without question." Then to me, 'Not a word of this must go out. There are sixty thousand enemy subjects here. Get a good cover-story from my DMI (Director of Military Intelligence). When you are ready write your own operation orders and show them to me personally.' That was all.

I had been given complete carte blanche, presumably to make trouble anywhere in Libya. Clearly, any threat to the 900-mile unguarded desert flank of the enemy's supply route along the North African coast would be taken very seriously. The C-in-C had conceived a big bluff.

There was much to do and but little time. Three of the old gang were available. Rupert Harding-Newman was on the spot in Cairo. Pat Clayton was surveying somewhere away in Tanganyika and Bill Shaw was in Jerusalem, curator of the Palestine Museum. Both were extricated, flown to Cairo and commissioned captains with 48 hours. Meanwhile Rupert collected 30 1½-ton commercial Chevrolet chassis from local dealers and elsewhere, and he and I set to work making all the detailed designs needed for Ordnance Workshops to make the many conversions we wanted. Bill Shaw became our intelligence officer and chief navigator and set to work acquiring and improvising all the instruments. There were to be three patrols, each self-contained and capable of independent action. A special ration scale was drawn up and authorised, as also were special footwear (sandals) and special Arab headdress for face protection against sandstorms. I raided the GHQ reserve of stores for machine guns and suitable long range radio transmitters. A very bright wireless officer volunteered to join, as also did a doctor.

General Freyberg agreed to ask his New Zealand Division for volunteers for 'an undisclosed mission of some danger'. There was a great response. Two officers and some 150 other ranks we had asked for arrived just as the first trucks were coming out of Workshops — tough self-reliant and responsible people with many useful skills. They were just what we had hoped for. Training was largely combined with cross-country journeys to Ain Dalla to make a forward dump of petrol there, as we had done in the old days. The New Zealanders were astonishingly quick to learn a new and to them a very strange way of life. I laid great stress on conservation. We were going a very long way without the possibility of obtaining anything anywhere. So there must be no losses and no breakdown involving the abandonment of a single vehicle.

We were ready on time. The C-in-C came himself to see us off and wish us good luck. The 150-mile sand dune barrier was crossed twice over in order to start fully loaded from the Libyan side. Then, on the very day, 15 September, the Italians crossed the Egyptian frontier going east along the coast, two little patrols

crossed the same frontier going west into Libya, 300 miles further south. Mitford's patrol penetrated so far west as to cross and examine both the enemy's southward routes to Kufra and Uweinat. Finding no signs of activity on either he turned pirate, driving southward and burning unguarded aircraft and aviation petrol dumps. A small convoy was intercepted carrying supplies and mail to Kufra. The crew and mail were captured and the trucks made to disappear without trace. Meanwhile Clayton took a more southerly route across southern Libya to make contact with a French outpost of Chad Province. He too found no trace of enemy activity. Both patrols returned triumphantly to Cairo having covered 60,000 truck miles in enemy territory without losing a single truck.

As a result, three more patrols were ordered to be raised, with volunteers from the Guards and from the Rhodesian and Yeomanry regiments. More raids took place during the next few months. Isolated garrisons were shot up. On occasion two posts, up to 300 miles apart, were attacked on the same day by mysterious troops who appeared from nowhere and disappeared. The Italian invasion was halted for a vital period. Wavell's bluff paid off.

As a final stroke in the Italian phase of the Libyan campaign, Clayton, Shaw and I decided to raid the Murzuk oases in the far southwest 1400 miles away, provided we could induce the French to help us with supplies. They were an unknown quantity to us. Douglas Newbold was then head of the Sudan Government. I flew to Khartoum to see him. With his secret backing I flew on to Chad. A contract was signed, with the provincial governor's blessing, between Lieutenant-Colonel Bagnold and the French Army whereby they would supply all we wanted on condition we let them join us with a token contingent consisting of the army commander himself and a captain. By implication, Chad Province would rebel and openly join the Allies and de Gaulle. The raid was very successful, though sadly the gallant French commander Colonel d'Ornano was killed. De Gaulle immediately sent as his replacement Colonel, soon afterwards the famous General, Leclerc. The latter and I became friends and cooperated closely till he left to join our 8th Army on the coast.

In the summer of 1941 Guy Prendergast arrived from England. I had wanted him badly from the start. Now, I felt, I could hand over to a younger man.

The Long Range Desert Group continued to play its unique role until the end of the North African campaign. It was the first of several 'private armies'. Its speciality remained, as it had begun in the old pre-war days, extreme mobility and accurate navigation. Occasionally two private armies would cooperate, as when the LRDG carried David Stirling's SAS, who then had no transport, to do their sabotaging of enemy aircraft on the ground.

'It is hard to believe that a mere generation ago, in the 1920s, a British officer or other official judged unlikely to become a nuisance, could travel overland unhindered from the border of China to the interior of the great northeastern desert of Africa without a passport. The 1914-1918 war in the Middle East and the final collapse of the once vast Turkish Empire left for a while a partial vacuum filled only by a handful of British agents, busy nursing newborn states but happy to help any travel-wise compatriot.

'The same war introduced the motor car to the region, notably the Ford Model T. For a long time cars remained associated only with made roads, as camels were with desert tracks. But I with a few others thought differently. Learning from experiment that our Fords could be driven virtually anywhere, along camel tracks and in their absence, we were the first to grasp the possibilities offered by the extraordinary political freedom of movement then existing.

'On short periods of leave we reached ancient faraway places previously seen only by those few with ample time and money. Ultimately, self-contained in all our needs for astonishing distances, and adept at crossing "impassable" sand seas and at confident navigation, we penetrated far into the then unexplored lifelessness of the Libyan Desert, into regions untrodden by man since Stone Age times.

'*Libyan Sands* which I wrote over 50 years ago describes those journeys and our struggles with natural obstacles. The title has nothing to do with current politics. It refers to the great desert which includes all Egypt and northern Sudan west of the River Nile. By an odd fate this title would have been even more apt a decade later. For, as I have outlined in an epilogue to this new edition, a few of us who happened to be still available formed the nucleus of the wartime Long Range Desert Group which operated within the heart of enemy Libya.'

—Brigadier Ralph A Bagnold OBE FRS, 1987

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